UNIVERSITY OF PENNSYLVANIA

THE OLD STONE AGE IN EUROPEAN RUSSIA

EUGENII ALEXANDROVICH GOLOMSHTOK

A DISSERTATION
IN ANTHROPOLOGY
PRESENTED TO THE FACULTY OF THE GRADUATE SCHOOL IN
PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR
THE DEGREE OF DOCTOR OF PHILOSOPHY

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THE OLD STONE AGE IN EUROPEAN RUSSIA

By Eugene A. Golomshtok

PREFACE

At the suggestion of the Director of the University Museum, Mr. Horace H. F. Jayne, the author has attempted to gather together all the available data concerning the Palaeolithic Period in European Russia.

Judging by the extent of information existing in non-Russian literature, this did not, at first, seem to be a large or a difficult task. Aside from the few sites discussed in short reviews of Russian Archaeological Congresses before 1917, and in occasional notes and scientific news, practically the only site to be thoroughly described is that of Ilskaya, published by Zamiatnin in l'Anthropologie. The standard summaries give us very little information. Thus, M. C. Burkitt lists nine sites, with some description; G. G. MacCurdy lists fourteen, with no details except the dating; Max Ebert indicates ten, only seven of which are of the Palaeolithic Period; O. Menghin discusses six with some interpretation.

A cursory study of the information available in Russian, however, showed the real dimensions of the task. It was soon realized that there exists a considerable amount of literature on the Palaeolithic period.[1] This literature is scattered through various small publications and reports, and the difficulty of assembling the information is increased by the fact that a certain portion of the literature is written in the Ukranian and Bielorussian dialects, which differ sufficiently from the main Russian language to make the careful reading of scientific works rather a difficult task.

Being an anthropologist of American training with little experience in Quaternary archaeology, the author found himself at times perplexed by the diversity of existing opinions, which he was not always able to reconcile. Some of these confusing statements and contradictory reports, as well as many omissions, might have been corrected by an actual study of collections and sites. This, however, should form a separate task for the future.

The present work also suffers from the fact that a certain number of publications, known by title, were impossible to obtain. Others may have existed, but for some reason may have escaped the attention of the author.

Therefore, this paper should not be considered as a final survey of extant material but, it is hoped that it may prove to be useful to those who do not know the Russian language, and perhaps even to some Russian students.

The author takes this opportunity to express his gratitude to the Board of Managers of the University Museum for the support they have given this project. Thanks are also due to the National Research Council for a Grant in Aid in 1934, which enabled the author to finish this manuscript.

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[1] The amount of archaeological literature existing in the Russian language may be judged from the fact that S. A. Dubinsky's "Bibliography of the Archeology of Bielorussia and Adjacent Regions," Minsk, 1933, gives 4031 titles.

The opportunity to publish this work in its present form was provided by The American Philosophical Society at Philadelphia, to whom the author wishes to express his sincere appreciation.

The author is very grateful to many Russian colleagues, who very kindly placed information at his disposal. He thanks especially P. P. Ephimenko, S. N. Zamiatnin, G. A. Bonch-Osmolovsky, V. I. Gromov, and V. A. Gorodzov. He is also extremely grateful to all those authors whose specific works have been used and whose illustrations have been reproduced.

The critical advice of M. L'Abbe Breuil, M. R. Vaufrey, Mr. H. Kelly and Mrs. Alice Kelly has helped greatly to clear up many obscure points in the evaluation of the industries. Thanks are due to M. L'Abbe Breuil for his kind permission to use some of his photographs as well as drawings of the industry of Kiik-Koba.

The author wishes to thank Miss Vivian Falk, Miss Dorothy Spencer, and Miss Lucy Cykman for the editorial work in connection with the preparation of this manuscript.

Last, but not least, the author wishes to thank Mr. Horace H. F. Jayne, Director of the University Museum, without whose enthusiastic help and encouragement this work would never have been accomplished.

EUGENE A. GOLOMSHTOK,
University Museum, Philadelphia.

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ABBREVIATIONS

B—in Bielorussian.
E—in English.
F—in French.
G—in German.
Gg—in Georgian.
P—in Polish.
R—in Russian.
U—in Ukrainian.

AA—American Anthropologist.
AC—Archaeological Congress.
ACBA—Archaeological Committee of the Bielorussian Academy of Sciences.
ALV—Annual Report of the Anthropological Laboratory of Theodore Vovk (T. Volkov).
BQC—Bulletin of the Quaternary Committee.
ESA—Eurasia Septentrionalis Antiqua.
GAIMK—The State Academy for the History of Material Culture.
PHPS—Problems of the History of Pre-Clan Society.
Q—Die Quartarperiode, Ukrainian Academy of Sciences.
RAJ—Russian Anthropological Journal.
RANION—Russian Association of the Social Science Research Institutes.
RAS—Russian Anthropological Society.

I. INTRODUCTION

SCOPE AND PURPOSE

Our knowledge of the Palaeolithic Period in European Russia is far from satisfactory. The sum total of information which has appeared from time to time in English, French and German, in the shape of small notices and miscellaneous notes, is quite negligible in comparison with the size of the country.

Yet, almost every specialist, particularly when writing on the general subject of the development of the culture of Prehistoric man, invariably points out the great importance of obtaining more precise and detailed information about the actual conditions of the cultural stages in Eastern Europe, the greatest part of which is European Russia.

It was decided, consequently, to gather as much data as possible about this area regardless of the language of the publication, continually endeavoring to present the first-hand information as given by the excavator, with the additional material of evaluation and correction when available or warranted.

The borders of the present European part of the U.S.S.R. were taken as geographical limits and the Palaeolithic Period proper (until the beginning of microlithic industries of Azilian and Tardenoisian times) as approximate temporal limits.

A short chapter on Quaternary Geology and Palaeontology was thought to be desirable and was prepared in collaboration with Mr. A. W. Postel of the Department of Geology in the University of Pennsylvania.

A SHORT HISTORY OF THE STUDY OF PALAEOLITHIC PERIOD IN RUSSIA BEFORE 1917

The first site of Palaeolithic age discovered in Russia was Gontzi, in the Poltava region. The find of fossil bones associated with flint implements, in 1874, attracted the attention of a local teacher, Kaminsky, who started the first investigation of the site. In 1877, Count A. S. Uvarov discovered mammoth bones with some stone implements on his estate near the village of Karacharovo. The resulting excavations proved the existence there of a Palaeolithic site. Two years later, Poliakov, who was participating with Uvarov in the excavation of Karacharovo, discovered one of the most important Russian sites, that of Kostenki I.

The trip of K. S. Merezkovsky, a professor of botany, to Crimea, resulted in the discovery of a series of cave sites, such as Suren I, Cherkess-Kermen, etc. About the year 1800, Antonovitch pointed out several Palaeolithic locations in the Dnieper region. This was followed in the next decade by a series of important discoveries, such as the work of N. I. Kristaphovitch in Novo-Alexandria, Kaschenko in Tomsk, V. V. Khvoiko in Cyrill Street, Kiev, Baron de Baye in Ilskaya, etc.

The work of the father of Russian archaeology, Count A. S. Uvarov, with his first attempts to summarize existing material and especially the studies of Theodor Volkov (later referred to in Ukrainian spelling as Th. Vovk) were the most important stimuli for the study of the cultures of the Quaternary period. The knowledge of Western European material enabled Volkov to correct many naive assertions of amateur investigators, and thus place Palaeolithic researches in Russia on a truly scientific basis.

The discovery of the late Palaeolithic site of Mezine in 1908, gave Volkov the opportunity to train in methods of excavation and interpretation of material a number of younger students, the most able of whom is P. P. Ephimenko, who today occupies the foremost place among the Russian specialists.

After an interval of almost forty years, the investigations in Gontzi were continued by Scherbakovsky, whose work has contributed to the understanding of this important site. In 1915, the Polish investigator, Krukovsky, made very extensive excavations in Kostenki. At about the same time the investigations by the foreign specialists, R. R. Schmidt, L. Kozlovsky and S. A. Krukovsky of several caves in the Caucasus yielded interesting results.

PALAEOLITHIC RESEARCH IN SOVIET RUSSIA

After the revolution, the interest in the study of early cultures of the U.S.S.R. reawakened with a tremendous impetus. This resulted in a series of very important new discoveries and the checking and following up of older sites. Thus, in 1922, Zamiatnin discovered and studied Borshevo near Kostenki, Zhukov and Gorodzov worked in Suponevo, Voevodsky and Gorodzov excavated Timonovka.[1] A series of sites was discovered and studied by G. A. Bonch-Osmolovsky and others, in Crimea; Berdizh, Gagarino [2] and new sites in Kostenki were excavated by Zamiatnin.

In Siberia, extensive studies were made in the Palaeolithic Period of Yenisei by Gero von Merhart, in Afontova Gora by Sosnovsky and Auerbach, and in the region of Irkutsk by Petri, Gerasimov (Malta) [3] and others.

The archaeological research was supplemented by a more detailed study of Quaternary geology (Pavlov, Mirchink, Krokos) and fauna (Gromov and Gromova), which afforded better dating and correlation.

A tendency to check the old works and study the material available in collections resulted in the fine description of Karacharovo and Ilskaya by Zamiatnin, and a series of old sites in Crimea by Bonch-Osmolovsky. The first attempt to summarize existing material by Uvarov in 1881 (Archaeology, The Stone Age), was followed by a special article of Spitzin in 1915 (The Russian Palaeolithic Period). Vishnevsky in 1924, gives a short discussion of the Stone Age in Russia in a special chapter following his translation of Osborn's work. It was followed by the only existing summary of the Russian Palaeolithic in foreign language by L. Sawicki.[4] It is a true foundation work for further researches from which a long list of illustrations has been reproduced in this survey. It is unfortunate that the work is in Polish,[1] and consequently, like Russian scientific literature, not easily available to Western European students.

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[1] Golomshtok, E. A., "Trois Gizements du Paléolithique Supérieur, Russe et Sibérien," L'Anthropologie, Vol. XLIII, 1933, pp. 301–27.

[2] *Ibid.*

[3] *Ibid.*

[4] Ephimenko in his general work on prehistory, "Pre-Clan Society," Leningrad, 1936, gives considerable material pertaining to the most important Russian sites.

The materialistic interpretation of history influenced the general attitude of Russian specialists toward the study of the culture demanding the investigation of every factor which may have influenced it. This was manifested by a number of so-called "complex" expeditions in which, alongside the ethnographical and anthropological data, information on local geology, fauna, flora, climate, etc., was obtained.

The same scheme, perhaps to a lesser degree, has been pursued of late in the realm of archaeology. A special Committee for the Study of the Quaternary Period was organized by the Russian Academy of Sciences in Leningrad for the purpose of studying Quaternary man in relation to his surroundings, as represented by climate, fauna, flora, etc.[2] The lead was followed by the Ukranian Academy which started a special periodical called "Die Quartarperiode," devoted to the same problems. Here, with the same aim in mind, geologists and palaeontologists work side by side with archaeologists, checking each other's work, and supplying necessary information.[3]

Several institutions such as the Institute of Archaeological Technology of the State Academy for the History of Material Culture, in Leningrad, and the Technological section of the Russian Association of Scientific Institutions in Moscow (RANION), devote their time to research in the technological processes encountered in archaeological studies.

Methods of excavation, correlation of material, and other theoretical subjects are often discussed in special conferences. The accepted decisions are published for guidance in future work.

It should also be borne in mind that modern students of the development of culture in the U.S.S.R. are firm believers in the evolutionary materialistic explanation of cultural changes. They are sternly opposed to the borrowing and migration theories [4] which, one must admit, are brought up much too often by the Western European scientists in their effort to explain puzzling cultural phenomena.

The same desire to obtain the clearest possible picture of culture with social, economic, and other factors outlined, coupled with the evolutionary theories of Morgan and Tylor, resulted in a series of attempts to reconstruct Palaeolithic society in all its phases.[5] While some of the results may be startling from the point of view of western scientists, and others may prove to be erroneous, the Russian archaeologists deserve definite commendation for their struggle with the purely mechanistic attitude which forgets the peoples who made artifacts and is interested in the objects *per se*.

[1] Sawicki, L., "Materials for the Study of Russian Archeology," Przeklad Archeologicznii, Poznan, Vol. III, Pt. 2–3, 1926–28.

[2] Bonch-Osmolovsky, G. A., "The Problems of the Complex Study of the Quaternary Period," Soobschenia of Gaimk, No. 3–4, Leningrad, 1932, pp. 44–49.

[3] Golomshtok, E. A., "Anthropological Activities in Soviet Russia," A. A., Vol. 36, No. 2, pp. 301–327.

[4] Meschaninov, I. I., "Palaeontology and Homo Sapiens," Izvestia of Gaimk, Vol. VI, Pt. VII, Leningrad, 1930, pp. 5–36; "The Theory of Migrations in Archeology," Soobschenia of Gaimk, No. 9–10, Leningrad, 1931, pp. 33–39.

[5] Ravdonikas, V. I., "The Marxian History of Material Culture," Izvestia of Gaimk, Vol. VII, Pt. III, IV, Leningrad, 1930, pp. 5–94; id., "To the Question of the Sociological Periodization of the Old Stone Age in Connection with the Views of Marx and Engels on Primitive Society," Izvestia of Gaimk, Vol. IX, Pt. 1–2, pp. 1–33.

In their effort to obtain the most complete information about the people whose remains they are excavating, Soviet archaeologists [1] are stressing the advisability of quantitative as well as qualitative analysis of the industry, thus quite often correcting the erroneous impression which results from overstressing the so-called "leading" forms, regardless of the comparatively small part those forms may have played in the culture of studied groups. In conformity with the materialistic philosophy of science, Russian archaeologists strive for functional interpretation of their discoveries. It is perhaps due to this hyper-sensitiveness to functionalism that Ephimenko, Zamiatnin and Gorodzov were able to recognize the remains of the semi-subterranean dwellings of Palaeolithic man. According to Ephimenko, similar habitations were found in Europe on several occasions, but passed totally unnoticed by the investigators.

The recently adopted method of microscopic analysis of charcoal and ashes found in the open hearths and fireplaces of Palaeolithic sites, supplies floral data and thus gives additional information on the climate.

The tremendous interest on the part of the Government and general public toward archaeology, coupled with their more systematic methods of excavation and study, resulted during the past seventeen years in the accumulation of a considerable body of material, which, taken with what was done before the revolution, permits us to form a comprehensive picture of the Old Stone Age in Russia.

SPELLING, TRANSLITERATION, ETC.

Because of technical reasons, the ideal method of giving all references in the alphabets of their corresponding countries cannot be used. Therefore, all original titles of works written in languages other than English, French, or German, are given in English translation. In those cases where several series are published by the same scientific organization under different headings, the name of the institution is translated into English, but the specific terms designating the particular series are given in transliteration. Thus, such terms as "Izvestia" (memoirs or reports) of the State Academy in Leningrad, or "Zapiski" (memoirs or reports) of the Imperial Geological Society, are retained.

The regional scientific institutions, such as the Ukrainian and Bielorussian Academies, publish their works in the Ukrainian and Bielorussian dialects respectively, with corresponding differences of pronunciation and spelling of proper names. Thus, the Ukrainian dialect has the tendency to change the G sound (as in good) to H (as in horn), e.g., "Hontzi" instead of "Gontzi"; the sound E (as in yet) and O (as in pole) to I (as in kill), e.g., "Kiiv" instead of "Kiev" and "Voronii" instead of "Voronoi." The Bielorussian dialect changes O to A (as in far), T to Tz. I to E; e.g., "Sazh" instead of "Sozh," "Tzimanavka" instead of "Timonovka," "Mensk" instead of "Minsk," etc.

Names of authors and place names are, therefore, given uniformly in a simple transliteration, preserving each time the "Great Russian" pronunciation; except in cases where a name has attained a standard English form.

The following transcriptions have been adopted in this work to represent some of the Russian sounds not found in English:

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[1] Bonch-Osmolovsky, G. A., "The Question of the Evolution of Lower Palaeolithic Industries," "Chelovek," 1928, No. 2–4.

Tch equal to ch as in chalk—Tchernigov
ia equal to ya as in German ja (yes)—Viatka
ie equal to ye as in yes—Dnieper
zh equal to French je (I)—Sozh
kh equal to ch as in German ach—Khvalinsk
tz equal to Z in German Zeit—Donetz

RECENT CHANGES IN PLACE NAMES AND BOUNDARIES

After the revolution, the old system of dividing Russia into Governments (Gubernia) and Counties (Uyezd) was changed. European Russia now consists of the Russian Federal Socialistic Soviet Republic, the Bielorussian Socialistic Soviet Republic, the Ukrainian Socialistic Soviet Republic, and a number of semi-independent and independent territories.

The larger geographical units (smaller than one of the above political divisions) are designated in this paper as *regions* and the smaller ones as *districts*. For example Gontzi, Lubni district, Poltava region.

The following changes of names, which went into effect after the revolution, should be noted:

Former Name	*Present Name*
St. Petersburg, later Petrograd	Leningrad
Nizhnii-Novgorod	Gorkii
Tzaritzin	Stalingrad
Simbirsk	Ulianovsk
Ekaterinodar	Krasnodar
Ekaterinburg	Sverdlovsk

II. THE PALAEOLITHIC PERIOD IN EUROPEAN RUSSIA

A. QUATERNARY GEOLOGY AND PALAEONTOLOGY OF EUROPEAN RUSSIA[1]

1. Pleistocene Glaciations

Geologists have shown a great divergence of opinion concerning the relative number of glaciations that Russia has undergone, as well as their correlation with the glacial periods of the rest of Europe. S. N. Nikitin[2] recognizes only one glaciation of this part of the world, whereas A. Girmounsky believes that the central U.S.S.R. underwent two glaciations, an opinion upheld for the southern part of the U.S.S.R. by D. Sobolev. L. Sawicki, A. Girmounsky, H. Hausen, H. Martensen, E. Kraus, and A. A. Grigoriev have also put themselves on record as believing that the western and northeastern regions of the U.S.S.R., respectively, were subjected to two periods of glaciation. Girmounsky correlates his two periods of glaciation with Mindel and Riss, while Sawicki establishes his correlation to Riss and Würm.[3]

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[1] Prepared in collaboration with Mr. A. W. Postel of the Geological Department of the University of Pennsylvania.

[2] Mirchink, G. F., "Number of Glaciations of Russian Plains," "Priroda," 1928, No. 7–8.

[3] Antevs, E., "Maps of the Pleistocene Glaciation," Bulletin of the Geological Society of America, 1929, Vol. 40.

The following writers have shown evidence to warrant the support of three great advances of the ice sheet in Russia: G. F. Mirchink, A. P. Pavlov, E. Antevs, N. Florov, B. Vishnevsky, and A. Pravoslavlev; later, in 1927, Girmounsky also came to hold this opinion. Mirchink, Pavlov and Laskarev, place a fourth and earliest period of glaciation in the late Pliocene, correlating it with Günz; the three Pleistocene glaciations they link with Mindel, Riss and Würm. Laskarev differs from Pravoslavlev in his sea parallels; he attributes the layers containing the shells of *Cardium edule* to Würm, thus placing the Khvalinsk and Hazar transgressions farther back. With this Mirchink disagrees, because the finds of *Cardium edule* in the highest horizons of the loess contradict it. W. I. Krokos believes, however, that all four epochs of glaciation may be placed in Quaternary time, citing as evidence four horizons of loess separated by three horizons of fossil soils of "tchernozem" (humus) type[1] in Ukraina. Mirchink criticizes this opinion on theba sis that Krokos failed to take into consideration the general history of the region in which he was working, and that his fourth loess horizon was established on the basis of twelve cross-sections situated far apart, and not continuous.[2]

Considerable disagreement of opinion is shown concerning the great peripheral moraine border in Russia. It is dated as Mindel by Pavlov, whereas Krokos and Mirchink place it in Riss. (Mirchink places the Mindel drift inside, running irregularly from lat. 52° N. long. 27° E.—Garyn River—over Mozir, Mogiliev, Moscow and Narechta to the Volga, lat. 57° N.) Florov agrees with the Polish geologists that in Eastern Europe the most extensive drift is Würm, and that it reaches far south into the U.S.S.R. The view that this moraine belongs to Würm, however, seems to be most inadequately supported. In Germany, the outer limit of the topographically young lake region is regarded also as the limit of the last ice sheet. This lake region runs northeast through northern Poland, the eastern Baltic area and across the northwestern part of the U.S.S.R. to the southern shore of the White Sea, and it may here, as in Germany, mark the extreme limit of the last glaciation. If the last ice sheet reached as far south in the U.S.S.R. as the drift, the accepted border in Germany would be wrong. The fact that the drift border, extending east from Khelm, Poland, cannot very well be Würm, may make it Riss. The older drift border running through Khelm, Przemysl, and Krakow, may be Mindel, which agrees with the determination made by G. Graham for Germany in 1928. As the probable Riss drift east of Khelm and the Boug River forms the outermost drift, it may perhaps connect with the outermost drift in the U.S.S.R., which, according to Mirchink, is of Riss age.[3]

In the U.S.S.R. this peripheral drift runs E.N.E. from lat. 51° N., long. 26° E. to lat. 61° N., long. 59° E. in the Urals; it has two long lobes that project south in the valleys of the Dnieper and the Don (see Map, Fig. 100). The youngest drift border may run from Vilna southeast to a point north of Minsk (according to Vollosovitch and Koslovsky), then northeast for a short distance to change east and again northeast to a point at lat. 56°45′ N., long. 33° E. (according to Hausen, Kraus and Mirchink). Mirchink's[4] latest map then carries it east to Yaroslav on the Volga, whence the border may run northeast to Osserdok on the Dvina, whence it probably goes north across the Gulf of Mezen to the Kanin Peninsula. Since Antev's maps have been published, Bobnovo marks the Brandenburg (Weichael), and Vishnii Volochok stage differently, extending the Flaming (Warthe) moraines in a fairly smooth curve over Moscow to beyond the Volga.[1]

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[1] Antevs, E., "Maps of the Pleistocene Glaciation," Bulletin of the Geological Society of America, 1929, Vol. 40.

[2] Mirchink, G. F., "Number of Glaciations of Russian Plains," Priroda, 1928, No. 7–8.

[3] Antevs, E., *op. cit.*

[4] Zhirmunsky, A. M., "The Question of the Limits of Glaciation on the Russian Plains," Bulletin of Quaternary Committee; 1929; Vol. I, pp. 21–26; is inclined to disagree with the work of Mirchink.

From the foregoing it may be seen that there is a great diversity of opinion concerning the designation, relationship, and nomenclature of the various glacial periods. That these relationships may be more readily seen and understood, the following table of the systems drawn up by different authors has been added. In the main, this outline has been based on the glacial time-sequence determined by Mirchink.

Sobolev,[2] describing the glacial deposits of the Ukraine, recognizes general but unequally distributed elevations of the earth's crust as contributing factors in the formation of centers from which the continental glaciation spread. These elevations caused an increase of erosion in the river valleys in the regions free from ice. Glaciation continued until crustal elevation ceased, and a reverse movement set in. Consequently, in the second half of each period of glaciation, sedimentation predominated over erosion in the river valleys, as the rivers lost their powers of erosion due to a decrease in their elevations. The deep erosion cuts were filled with fluvio-glacial formations. By covering, changing, and dispersing moraine materials the drainage systems formed terraces.

2. Mindel Glaciation

In the beginning of the Quaternary period, the northern part of Russia was covered by an ice sheet which, according to Pavlov, was the Mindel glaciation. In the eastern part of Russia at this time the familiar outlines of Volga could not be found; the large Volga valley did not exist. The tongues of the glacier extended to the contemporary bed of the Volga between Tzaritzin and Kamishin and penetrated farther east in the present Trans-Volga region. One of these tongues spread from Tzaritzin toward Manich.[3]

Pavlov [4] states that the deposits are of a highly altered red-brown material and extend farther than the line usually considered as the maximum extent of glaciation. The extent of this glaciation is hard to determine exactly, as much of the terminal material has been destroyed by subsequent glaciation to the south and southwest. In the district of Khorol, near Ostapia, beneath the moraine of the second glaciation is a lacustrine deposit thirty feet thick containing fresh-water shells, below which is found material of the first glaciation: glacial sands, gravel and erratics. In other places the second glacial moraine is separated from that of the first by a bed of black earth which indicates a mild interglacial period. In this region the first and second glaciations seem to have been of equal extent.

In southwestern Russia and Galicia it is difficult to set a precise limit to the Mindel glaciation, because, in this region the moraines of the first glaciation were also removed by

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[1] Antevs, E., "Maps of the Pleistocene Glaciation," Bulletin of the Geological Society of America, 1929, Vol. 40.

[2] Sobolev, D., "Quaternary Morphogenesis in the Ukraine," Second International Conference of the Association for the Study of the Quaternary Period of Europe, Vol. II, Moscow, 1933; pp. 71–101.

[3] Vishnevsky, B. N., "Prehistoric Man in Russia," appendix to the translation of Osborn's "Men of the Old Stone Age," Leningrad, 1924, pp. 441–508.

[4] Pavlov, A. P., "Époques glaciaires et interglaciaires de l'Europe et leur rapport à l'histoire de l'homme fossil," Bulletin de la Société des Amis des Sciences Naturelles, d'Anthropologie et d'Ethnographie, 1925.

TABLE 1

COMPARISON OF THE GLACIAL NOMENCLATURE OF VARIOUS AUTHORS

Penck and Bruckner (1909)	P. Range 1926	German Designations 1925	Krokos[1]	G. F. Mirchink[2]	H. Breuil[3] N. France S. England 1934	A. L. Reingard[4] 1933 Caucasus	A. Vardaniantz[5] 1933 Central Caucasus	G. Graham 1928 Germany	L. von Waweke 1927
Feman							7 Period XVII–XIX Cent		
Egessen							6th Period Historical		
Daun							5th Period		
Geschnitz			Post Glacial		1 Post Würm I	Retreat	4th Period		
Buhle	Baltic Stage	Third or Last Glaciation (Wisla)		Würm II	Würm III		3 Period 2 Period 1 Period		
Würm	4th Glaciation		Würm II Würm Interglacial Würm I	Würm I	Würm II Würm I	a-Main Period b-Second Period	Maximum	Warthe	Last Glaciation
Riss-Würm			Riss-Würm	Riss-Würm	Riss-Würm				
Riss	3rd Glaciation	2nd Glaciation (Saale)	Riss	Riss	Riss	a-2 Period b-Main Period		Saale	Glaciation Before the Last
Mindel-Riss			Mindel-Riss	Mindel-Riss	Mindel-Riss	Mindel-Riss (of Long Duration)			
Mindel	2nd Glaciation	1st Glaciation (Elster)	Mindel	Mindel	Mindel			Elster	First Glaciation
Gunz-Mindel			Gunz-Mindel	Gunz-Mindel	Gunz-Mindel				
Gunz	1st Glaciation		Gunz	Gunz	Gunz	Suspected		Elbe	Oldest Glaciation (Elbe)

[1] Krokos, V. I., "Materials for the Study of Quaternary Deposits in the Ukraine," Materials for the study of Ukranian Soils, Vol. 5, pp. 1–326, Kharkov, 1927.

[2] Mirchink, G. F., "Number of Glaciations of Russian Plains," "Priroda," No. 7–8, 1928.

[3] Breuil, H., unpublished chart.

[4] Reingard, A. L., Second International Conference of the Association for the Study of the Quaternary Period of Europe, Vol. II, pp. 3–14, Moscow, 1933.

[5] Vardaniantz, L. A., Second International Conference of the Association for the Study of the Quaternary Period of Europe, Vol. II, pp. 15–20.

the second advance of the great ice sheet, as shown in the central part of the Volyn region near Ostrog and Doubno, and in Galicia near Brody. The glacial erratics here are not of the country rock, and the moraine material is highly altered and wind-polished. That these materials belong to the first glaciation is confirmed by Gagel and Karn, because decomposed materials are found beneath the Mindel-Riss interglacial beds containing typical time markers (botanical remains and fresh water molluscs) at three points on the borders of the Boug, descending towards Voldava. Thus, in the southwest also, the Mindel and Riss glaciations seem to have nearly the same distribution, and are separated by an interglacial bed, which indicates a long time interval.[1]

As in the rest of Europe, there are abundant beds of river alluvium in the regions of the lower Dnieper, in Bessarabia, and the Don. A striking example is the Tiraspol gravel on the left bank of the Dniester near Tiraspol, which was probably laid down at the end of Mindel.

The work of Sobolev[2] in the Ukraine shows how the elevation accompanying the Mindel glaciation accentuated erosion to form wide valleys. As a lowering of the ground occurred, erosion changed to sedimentation. This is illustrated on the middle Dnieper terrace by the deposition of fluvial glacial sands on the erosion base; in places these sands are displaced by dark bluish loams; on the drainage divides these are in turn displaced by loess-like clays. At the end of Mindel (or the beginning of Mindel-Riss) these beds were covered by loams containing fresh water fauna (*Paludina* were absent). On the main Dnieper terrace the typical Mindel-Riss terrace sands occur with *Paludina diluviana* and *Elephas trogontherii;* these sands cover the Mindel fluvio-glacial formation.

3. Mindel-Riss Interglacial Epoch

The retreat of the ice in the interglacial period left traces in the form of a moraine in the northwestern part of the Saratov region, and in the neighboring terrain of the Tambov and Penza regions. The boulders of local and more northern formations are the markers of its route. These traces are in general almost absent in the south and in the southwest.

With the retreat of the glacier, a regional subsidence occurred. The northern regions of Russia were inundated by the sea in the vicinity of the basins of the Northern Dvina and Pechora. This wide sea was of considerable depth and was inhabited by a polar fauna in its deeper parts, while along the shores molluscs of a more temperate habitat have been found. In the south there was a somewhat different picture, with lakes and streams dominating. The powerful rivers washed out wide vallies and deposited sands and gravels. In the northern part of the Trans-Volga area, slower streams, lakes and swamps prevailed.

In the districts of Khorol and Ostapia the lacustrine deposits of this period cover the erratics of the Mindel glaciation and are in turn covered by the sands and erratics of the Riss advance.[3]

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[1] Pavlov, A. P., "Époques glaciaires et interglaciaires de l'Europe et leur rapport à l'histoire de l'homme fossil," Bulletin de la Société Naturaliste de Moscow, 1922.

[2] Sobolev, D., "Quaternary Morphogenesis in the Ukraine," Second International Conference of the Association for the Study of the Quaternary Period of Europe, Vol. II, Moscow, 1933, pp. 71–101.

[3] Pavlov, A. P., "Dépôts Néogenès et Quaternaires de l'Europe Mériodionale et Orientale," Mémoir de la Section Géologique de la Société des Amis des Sciences Naturelles, d'Anthropologie et d'Ethnographie, Vol. V, Moscow, 1925, pp. 1–215.

In the south, the climate became temperate and moist. The elevated areas were covered by vegetation and the stony soil was mantled by humus. In the eastern part of the Saratov region, as well as in Penza, the Don region, Poltava, and to the south of Moscow, there were large lakes, the remains of which still exist to-day. The southern mammoth rhinoceros, *Cervus latifrons*, *Bos*, and horse constituted the fauna.[1]

4. Riss Glaciation

The Riss glaciation, according to Mirchink, represents the epoch of greatest glaciation in Russia. The new advance of the ice brought with it the debris of northern formations. Northern Russia was subjected to a land elevation which caused the seas occupying the basins of the Northern Dvina and Pechora to retreat. The glaciers of Scandinavia spread southward filling the Baltic sea, while in the Caucasus masses of ice descended slowly, sending tongues downward and outward to fill the valleys. The glaciation covered the valleys of the Dnieper and the Don in the depression of the Russian ravine. (See map, Fig. 100.)

Pavlov says that this second advance of the ice was of long duration, and, like Mirchink, he correlates it with the Riss of the Alps. Its southern limit can be more or less definitely traced. The boulders carried by this glaciation are from the Volyn region, north of Lutzk and Rovno. In the Kiev region, the southern border of their distribution descended along the valley of the river Dnieper, reaching the northern part of the Ekaterinoslavl region, thus forming one of the southernmost tongues. The ice sheet then receded northward to form another tongue which, turning again in a southern direction, reached to the head waters of the Don, almost to the village Ust-Medveditza. From there it turned north again through the Saratov, Penza and Simbirsk, regions to Nijnii-Novgorod, and then by a broken line reached across Viatka and Perm to the Ural Mountains.[2]

In the south of Russia the waters from the melting glacier formed rivers depositing clays and sands. This enormous territory was not cut by river beds at that time. The higher and dryer places show the results of wind and water action, and form the most ancient loess layer in the Kursk, Tchernigov and Volyn regions. The southeastern part of Russia had a continental climate during this period. Strong rains filled the valley with debris, the higher regions received a deposition of sandy-clay formations over which at the end of this epoch the layer of loess reached its maximum thickness.

According to Sobolev,[3] the ice advanced on Poliesie and Ukraine along two routes, from the south through Poland along the Poliesie depression, and from the north along the Dnieper depression. Due to specific topographical conditions and differences in the country rock, the fluvial deposits of the two regions are different. Fluvio-glacial sands were deposited on the Poliesie terrace, while fluvio-glacial loams were deposited on the main terrace of the middle Dnieper. These formations are nevertheless synchronous.

Erratics left by the ice sheet have been found in Poltava, Kalouga, and Tchernigov. In the southwestern parts of the great European plain the glacier blocked the streams flowing south until they overflowed, the swifter currents depositing sands and the slower ones fine loess-like muds. The sandy beds along the valleys of the Mokcha, the d'Alatyr and the Soura rivers belong also to this period.[1]

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[1] Vishnevsky, B. N., "Prehistoric Man in Russia," appendix to translation of Osborn's "Men of the Old Stone Age," Leningrad, 1924, pp. 441–508.

[2] Vishnevsky, B. N., *loc. cit.*

[3] Sobolev, D. N., "The Quaternary Morphogenesis in the Ukraine," Second International Conference of the Association for the Study of the Quaternary Period of Europe, Vol. II, Moscow, 1933, p 85.

In the Caspian region the brackish sea diminished in size, and there appeared lakes, swamps, and areas rich in fine grass and vegetations where large herds of camels, wild horses, antelops, and numerous steppe rodents found their habitat.[2]

The complex of the glacial formations of this time consist of moraines which are usually expressed in the Moscow region by red-gray pebble clays, often superimposed on fluvio-glacial formations of cross bedded sands, containing lenses of gravel. Forming a part of the glacial complex loess-like loams and clays covering the moraines are found; very likely they represent the products of a washing out of the moraine *in situ* during the melting of the ice. Farther south the moraine becomes thinner, and contains more material from the local formations. In the Poltava tongue this is noticeable in the loess-like character of the moraine, the result of a re-working of the underlying loess; in the Don tongue, this is evident from the gray coloring and a considerable quantity of chalk pebbles that are present.

The peculiarity of this glacial complex lies in the fact that the moraines of both tongues participate in the formation of the upper river terraces. This is seen in the descent of these moraines toward the valleys of the rivers which have these terraces. Thus, it can be traced along the Dnieper from Orsha up to the southern border of its spread. In nonglaciated regions, in the river valleys, such as along the river Vorskl, the lower Poltava, and along the Dnieper above the Kremenchug, it can be seen that stratigraphically the moraine is supplanted by the ancient alluvial sands, which form the upper terrace. These sands in their turn are covered by a layer of the upper horizon of the loess. The position corresponding to the sands of the upper terrace is taken by the second (counting from above) horizon of the loess, which is separated from the upper by a layer of fossil humus.[3] In reference to this same complex Mirchink states that V. I. Krokos confused the normal loess with the loess-like loams which are intimately connected with this moraine, and attributes them to Riss glaciation. Mirchink feels that he has failed to trace the further development of these loams to the point where they turn into fine grained sands of fluvio-glacial origin.

In places, the erosion accompanying the Riss has cut through the main terrace of the middle Dnieper to the Jurassic clays. This terrace is superimposed, after an erosion interval, on the Mindel-Riss terrace which is composed of sands and loams. The main terrace here was changed during the Riss glaciation both by erosion and deposition and on its surface fresh water loam deposits and moraine material were laid down. This Riss terrace is equivalent to the moraine terrace of Poliesie, the fluvial-glacial deposits of which are contemporaneous with the loams of the Middle Dnieper. Part of the Riss terrace was formed by the filling of the pre-Rissian erosion depressions, first by Riss fluvial-glacial deposits, and then by valley glacier sands. (This process may have continued through Riss-Würm.) The terrace has been considered Würm by some investigators, as it has only one layer of loess; the argument, though, is not convincing as only one layer of loess is likewise to be found on the main terrace in the region of Tzibli.[1]

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[1] Pavlov, A. P., "Dépôts Néogenes et Quaternaires de l'Europe Meriodionale et Orientale," Mémoir de la Section Géologique de la Société des Amis des Sciences Naturelles, d'Anthropologie et d'Ethnographie, 1925.

[2] Vishnevsky, B. N., "Prehistoric Man in Russia," appendix to translation of Osborn's "Men of the Old Stone Age," Leningrad, 1924, pp. 441–508.

[3] Mirchink, G. F., "Number of Glaciations of Russian Plains," "Priroda," No. 7–8, 1928.

Under these deposits no formations are found that can be attributed to the glacial formations proper. Thus in the Dnieper region, we have only a layer of loess separated by a layer of fossil soil from the covering fluvio-glacial formations.

Moving in a northern direction we encounter, along the Dnieper and south from Riechitza, the horizon of the red-gray and gray pebble moraine and sandy soils, systematically traceable in cross sections, which stratigraphically occupy the same place that in more southern regions is taken by the horizon of loess under the glacial formations of the Riss period.

In the ice-free region of the Dnieper, the glacial formations of Riechitza are contemporaneous with the loess layer which underlies the Riss glacial deposits. North from Riechitza this horizon of the glacial formations is more easily traced, and allows an opportunity to follow the southern limits of the Mindel glaciation through Mozir, Riechitza, Roslavl, and the central part of the Moscow and Vladimir regions.[2]

The advance of the Riss ice sheet caused great changes in climate. During the height of this glaciation the climate was intensly cold; but farther to the south in Russia there still existed rich prairies which supported a tundra fauna.[3] Many animals migrated to these surroundings, and either accommodated themselves to the new environment or died out. In the tundra region herds of wild horses existed, while closer to the ice belt lived the woolly mammoth, the reindeer and the musk-ox.[4]

The topographical changes of this epoch were also pronounced. The eastern part of the Volga region was depressed, forming the present region of the trans-Volga meadow lands; this sunken area was occupied by the waters of the enlarged Caspian Sea, which spread far north during this epoch as well as in the following interglacial period. Toward the end of this glaciation, the waters from the retreating glacier cut the present valleys of rivers, making beds in the deposits of loess and in underlying red clays. The final fresh-water conversion of the enormous inland sea, which was receiving the rivers of southern Russia and filling the Black Sea depression, took place during this epoch. The water level of this inland sea fell considerably. In other regions quite different events took place. First in the southwest, then also in the west, in the regions of Simbirsk and Nijnii-Novgorod, the glacier obstructed the rivers flowing northward, causing them to overflow and fill with sand the lower regions where there now exist wide belts of sand and small rivers.[5]

5. Riss-Würm Interglacial Epoch

After the final retreat of the Riss ice sheet the northern regions of Russia were left covered by large erratic boulders and stony materials that had been carried down from Scandinavia and Finland with the advancing ice. Lakes were formed in the lower area, while large swamps occupied the ice-freed land.

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[1] Sobolev, D., "Quaternary Morphogenesis in the Ukraine," Second International Conference of the Association for the Study of the Quaternary Period of Europe, Vol. II, Moscow, 1933, p. 95.

[2] Mirchink, G. F., "Number of Glaciations of Russian Plains," "Priroda," No. 7–8, 1928.

[3] Gorodzov, V. A., "Archaeology, The Stone Age," Vol. I, Moscow, 1925.

[4] Vishnevsky, B. N., "Prehistoric Man in Russia," appendix to translation of Osborn's "Men of the Old Stone Age," Leningrad, 1924, pp. 441–508.

[5] Vishnevsky, B. N., *op. cit.*

The fresh water marls and peats along the Boog near Vlodava belong to this period, as probably do the lacustrine deposits of Troitskoye near Moscow; below these deposits are gravels, while over them lie moraine materials (sands and gravels). The Riss-Würm is also represented by the lake formations in the Drutskoi ravine near Grodno on the Nieman; similar deposits occur near the village of Pepelevo on the river Chuya in the region of Kostroma. These lakes probably existed in the earlier half of Riss-Würm.

In the middle portions of the Russian plain (regions of Poltava, Chernigov, and Koorsk), in valleys cut by the Riss glaciation, are sand deposits which, with the deepening of the valleys in the following epoch, form terraces above the alluvial terrain.

In the more northern regions of the Russian plain this period is represented by deposits laid down by marine transgressions. Deposits of this type are to be seen near Petrosavodsk and along the northern Dvina.[1]

6. Würm Glaciation

The limit of Würm glaciation is difficult to determine because the fluvio-glacial outwash of the Baltic pause masked or destroyed the true moraine materials. In central Russia it is also hard to determine whether the moraine materials belong to Riss or Würm, which also makes it difficult to ascertain whether the adjacent interglacial deposits are Riss-Würm or Mindel-Riss.[2]

Gorodzov describes the ice sheet of the fourth glaciation at its greatest extent as spreading southward from its Scandinavian center into Germany and Poland, and from there into southeastern Russia. In the region of Germany and Poland its border was less extensive than the third glaciation, while in Russia the southeastern limit of the ice lay some 500 kilometers northwest of the border line of the third glaciation. It lies on the line of Suvalki-Vilno-Vitebsk-Novgorod from about lat. 54° N., long. 23° E. to lat. 51° N., long. 31° E. and further on to the beginning of the Onega River. In these regions the remains of the glacial deposits are especially fresh, the moraines are well preserved as are also the various fluvio-glacial formations. The glacial deposits consist of reddish-gray boulder clays. The end moraines have the appearance of wide elevated bands of boulders and pebbles, or of sharply outlined chains of boulder-pebble hills which are well preserved in the Vitebsk and Pskov regions. The end moraines usually are accompanied by sands deposited by streams flowing from under the ice.

Contemporaneously with the formation of the topography of the glaciated zone, gully erosion became active in the area south and west of the zone and moved the loess and other clay soils from the heights to redeposit them at lower elevations. During the same time sands were deposited in the basins of the Pripiat, Desna, Oka, Viatka, Pechora, and Northern Dvina, which later developed into dunes.[3]

Increased erosion preceded the Würm glaciation. Its action can be traced northward along the valleys of the rivers of the Ukraine, though it did not proceed far enough to destroy the gullies of the tributaries. The outwash from the melting ice covered the Poliesie terrace with Würmian sands. This terrace rests on Riss foramtions. In the Ukraine the Würm terraces are composed of sandy deposits. Here the deposition of the Würm loess was completed before the formation of the terrace. (There is no loess capping the terrace.) The upper loess covers the Riss moraine and is separated from it by a layer of fossil soil. Consequently the covering sands of Poliesie are of the same age as the sands of the second terrace and the upper loess of the middle Dnieper. In southeastern Poliesie there is a zone of aeolian deposits which were formed and transported during Würm.

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[1] Pavlov, A. P., "Dépôts néogenès et quaternaires de l'Europe, mériodionale et orientale," Mémoir de la Section Géologique de la Société des Amis des Sciences Naturelles, d'Anthropologie et d'Ethnographie, Moscow, 1925.

[2] Pavlov, A. P., "Époques glaciaires et interglaciaires de l'Europe et leur rapport á l'histoire de l'homme fossil," Bulletin de la Société Naturalists de Moscow, 1922.

[3] Gorodzov, V. A., "Archaeology, The Stone Age," Vol. I, Moscow, 1925.

Sobolev considers the Dnieper moraine with its corresponding fluvio-glacial formations to be Riss. He dates the moraine of the east Poliesie tongue as the Poliesie stage of Würm; to the same age belong the covering sands, the valley glacial deposits, and the terrace. These formations were later incorporated in the sands of the second (Borovaya) Dnieper terrace, though this terrace may also contain materials of the Bielorussia stage, and perhaps even later stages of Würm.[1]

Vishnevsky in his work describes the Würm glaciation as being less extensive than the preceding glacial epochs. According to him, the ice sheet covered only the Baltic Sea, spreading along its eastern shores but not penetrating far inland. The nearby ice sheet covering northern Germany caused an arid and cool climate to prevail. In the areas neighboring the glacier a tundra developed with characteristic fauna and flora. The mammoth, so abundant in previous epochs, became rare and its place was taken by the reindeer.

The land in the far south, free from ice, gradually sank. This allowed the waters of the Mediterranean to flow into the Black Sea basin, which formerly had been comparatively small. This newly formed Black Sea had at this time a higher level, and covered the mouths of most of the south Russian rivers. It was at the end of these events that the south of Russia acquired its contemporary topography.

Toward the end of the Würm epoch the climate became warmer and dryer; the ice commenced to thaw, and the formation of diluvial loess began.

The upper horizon of loess in the Dnieper region is separated in the ice-free areas from the underlying loess horizon by a layer of fossil soil; this corresponds to the Würm glacial complex. In the regions of the Dnieper which were affected by this glaciation, this horizon is separated by the fossil soil from the underlying fluvio-glacial and alluvial formations of the Riss glaciation which are represented by thin and sometimes cross-bedded sandy soils that pass into true sands further to the north. The upper non-inundated terraces of the loess of this horizon lie either on the ancient alluvial formations of the Riss epoch (in non-glaciated regions), or on the horizon of the Riss moraine which descends on the upper non-inundated terraces. In a northern direction the ancient alluvial deposits of these terraces turn into sands which encircle the end moraines along the line: Slutzk-Minsk-Lukoml-Charea-Orsha-Smolensk-Tvier-Kostroma-Lake Kubanskoe[2] (lat. 53° N., long. 67° E. to lat. 59° N., long. 40° E.).

In summarizing the glaciations undergone by Russia in Pleistocene time, Mirchink says: "The three complexes of the glacial formations in the regions affected by the ice are associated with three groups of continental formations in the form of three horizons of loess. The upper one (the first) covers the glacial formations of the maximum activity of the Riss glaciation.

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[1] Sobolev, D., "Quaternary Morphogenesis in the Ukraine," Second International Conference of the Association for the Study of the Quaternary Period of Europe, Vol. II, Moscow, 1933, pp. 71–101.

[2] Mirchink, G. F., "Number of Glaciations of Russian Plains," "Priroda," No. 7–8, 1928.

"The upper non-inundated terrace corresponds to the epoch of the Riss glaciation. This formation covers the third horizon of the loess and underlies the formation of the minimum glaciation. This is the third terrace of Lichkov. The second non-inundated terrace (the second of Lichkov) which covers the glacial formations of the Dnieper tongue corresponds to the Würm glaciation. The Mindel terrace is evidently covered so completely that it cannot be well traced." [1]

Mirchink also points out the importance of the fluctuations of the level of the Caspian Sea as an indication of ice movements and climatic changes. He says: "The fluctuations of the Caspian basin, which furnish a very sensitive geological barometer, corresponded to the three periods of glaciations. This occurred in each case when the increased flow of water from the melting of the receding glacier took place at the end of an epoch of glaciation. Three of these transgressions are known: Khvalinsk, Hazar and Babinsk. The more ancient transgressions of the Caspian such as Apsheron and Akchalig took place in Pliocene time, and if they could be connected with glaciations, as was indicated by A. P. Pavlov, we could deal with the Pliocene glaciations, in which we will have put the problematical Günz glaciation."

It is more difficult to draw similar parallels for the Black Sea basin, which previous to its joining with the Mediterranean should have been reacting in the same manner as the Caspian to the climatic changes. However, to trace these changes as accurately as in the case of the Caspian is impossible, because the joining of the Black Sea with the Mediterranean, which took place in post-Würmian time, caused such a rise of the sea level as to obliterate all traces of the previous transgressions.[2]

7. Fauna of the Würm Glaciation

V. A. Gorodzov says of the fauna of this epoch that the mammoth and rhinoceros were commencing to die out here as in Western Europe, and therefore did not penetrate into the zone occupied by the last glaciation of Russia, because they had perished before the land was sufficiently freed from ice to give them a habitat.[3] Pavlov also states that *Elephas antiquus* and *Rhinoceros merckii* are no longer found during this epoch, and *Rhinoceros tichorhinus* is also extremely rare, being found only in the lower layers of the horizon.[4]

Speaking of *Elephas antiquus*, Gorodzov says that this animal (which is not known as far east as Moscow-Odessa) died out with the approach of the Riss ice sheet. *Elephas trogontherii* was more adaptable than *Elephas antiquus*, and outlived the latter. *Rhinoceros merckii* spread across Europe and Siberia, but had died out by the end of the Quaternary period.[5]

[1] Mirchink, G. F., "Number of Glaciations of Russian Plains," "Priroda," No. 7–8, 1928.

Mirchink, G. F., *ibid.*

[3] Gorodzov, V. A., "Archaeology, The Stone Age," Vol. I, Moscow, 1925.

[4] Pavlov, A. P., "Époques glaciaires et interglaciaires de l'Europe et leur rapport à l'histoire de l'homme fossil," Bulletin de la Société Naturaliste de Moscow, 1922.

[5] Gorodzov, V. A., "Archaeology, The Stone Age," Vol. I, Moscow, 1925.

Further notes on the fauna of this period will be found in the concluding section of this outline.

8. Post-Glacial Epoch

The opening of this period is marked by the deposition of sand and silt on the valley floors and was accompanied by accumulations of alluvial loess in the valley declivities. These diluvial deposits often contain archaeological sites (Cyrill Street at Kiev, Mezine in the region of Chernigov, and Gontzi on the River Udai in Poltava). *Elephas antiquus* and *Rhinoceros merckii* are lacking in this epoch. *Rhinoceros tichorhinus* is also absent in this period—or extremely rare—in the lower horizon of the post-glacial formations. The mammoth still survived, but conditions were becoming increasingly unfavorable for it as it was becoming an easy prey for man. Thus mammoth bones are already rare in the upper layers of the Cyrill Street station,[1] which are of Magdalenian age.[2]

According to Pavlov, the first glacial pause of the final retreat, the Buhl, was marked by a lowering of temperature throughout Europe, and by an extension of the tundra environment. After the termination of the Buhl stage, the climate became milder and more humid; the reindeer disappeared from the middle latitudes of Europe, and forests supporting deer appeared. As the ice continued to retreat to the north and west, the Russian plain took on steppe characteristics with such fauna as wild horses and antelope. When the retreating ice again paused in southern Finland and Scandinavia, the climate of the plain became more severe and humid.

In northern Europe the retreating ice of the last glaciation left shallow depressions behind it. These were filled by the waters of the North Sea, which then connected with the Baltic to form the Yoldic Sea. The climate was cold with a corresponding cold fauna of tundra type, while steppe conditions still prevailed farther south. With time the climate became warmer; the sea which developed after the glacier became smaller, and finally became separated by dry land from the White Sea and the North Sea on the northeast, and from the German Sea on the southwest. This resulted in the formation of an enormous fresh-water lake with an area of some 570,000 sq. km., called the Ancyl Sea after the mollusk most commonly found there. The polar fauna of the Yoldic Sea changed to one corresponding to more temperate and more humid conditions. The epoch of Ancylus was characterized by a land elevation followed by a renewed sinking that connected this lake with the German Sea. The climate became milder and warmer than that of the present, and in the salt waters of the Baltic *Littorina litorea* and a temperate zone vegetation existed. The beginning of this Littorine Sea is in the contemporary geological epoch, the Holocene.[3]

Mirchink describes the geographical distribution of the end moraines of the glacial pauses during post-glacial times. North from the line of distribution of the Würm terminal moraines, and connected with them, we find another series of end moraines definitely expressed. The southernmost of them are situated along the line of continuation of the Baltic end moraines of Germany. Those which border on the so-called lake region show better form than the others. They run along the line of Vilno-Lepel-Senno-Vitebsk-Toropetz-Ostashkov-Borovichi—that is roughly lat. 54° N., long. 25° E. to lat. 57° N., long. 34° E.—and the northern shore of the Oniega Lake and Niandoma. Behind this boundary is situated another line of end moraines in the direction of Tukkuma-Riga-Valk-Pskov-Luga-Petrozavodsk-Oniega-Archangelsk from lat. 57° N., long. 22° E. to lat. 65° N., long. 41° E. Finally, the last row is formed by the southern Finnish terminal moraines. No other formations or independent terraces are found which can be placed in actual connection with the time of formation of these end moraines. The only exception is the southernmost moraine. During its formation occurred the accumulation of the alluvial deposits of the lower terrace, the top of which was formed during the maximum of the Würm glaciation. Consequently, it is reasonable to consider these end moraines as marking the final retreat of the glacier, and to see in them an analogy to the Buhl, Geshnitz, and Daun stages of the Alps.[1]

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[1] Pavlov, A. P., "Dépôts néogènes et quaternaires de l'Europe mériodionale et orientale," Mémoir de la Section Géologique de la Société des Amis des Sciences Naturelles, d'Anthropologie et d'Ethnographie, 1925.

[2] According to P. P. Ephimenko, "Pre-Clan Society," Leningrad, 1936.

[3] Vishnevsky, B. N., "Prehistoric Man in Russia," Appendix to the translation of H. F. Osborn's "Men of the Old Stone Age," Leningrad, 1924.

9. Loess Deposits of European Russia

The following description of the loess formations of Russia has been condensed from a recent paper by Vera Malycheff.[2]

The origin of the loess deposits is still a matter of dispute; therefore the question will not be gone into here. It is sufficient to say that various authors have ascribed the origin of these deposits to fluvio-glacial streams, to normal stream deposition, and to wind action.

The loess deposits of Russia have their principal development south or southeast of the Baltic stage of the Würm moraines. In their distribution, it is possible to distinguish four regions: first, the northern region including the upper basins of the Dnieper and the Volga; second, the eastern region which includes the middle and lower basins of the Dnieper and the Crimean steppes; third, the central region which takes in the basin of the Don, the middle basin of the Volga, and the steppes to the north of the Caucasus; and fourth, the southeast region around the Caspian depression.

The northern region runs south from the Baltic moraines and the central part of the Arctic marine transgressions. The loess blanket is not continuous but forms a series of disconnected islands, which, in the basin of the Dnieper, according to Mirchink, are composed of aeolian loess. By other authors, as Berg, they are considered to be sandy loess-like muds of aqueous origin; the beds are often pebbly, sometimes stratified, and always less rich in lime than true loess. Throughout this region the loess is localized along declivities; it is lacking on the high elevations. The base of the formation is often composed of coarser, more pebbly material which sometimes grades into deposits of a lacustrine type. Under the moraine deposits that this loess covers is found in several places a second level of loess-like silt which separates these deposits from the next underlying older moraine. In the eastern part of this region some argillaceous loess-like formations have been reported.

The other three regions, lying to the south of the last region described, possess a certain number of traits in common. The loamy blanket attains a considerable thickness, and a more or less perfect continuity; in places the formation enclosed beds of fossil soil. In the parts of this region that were covered by the Riss glaciation, the loamy formation is superimposed on the Riss glacial deposits, from which it is ordinarily separated by a zone of outwash sediments or fossil soil. Below the moraine deposits there is frequently found a second and older layer of loess.

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[1] Mirchink, G. F., "Number of Glaciations of Russian Plains," "Priroda," No. 7–8, 1928.

[2] Malycheff, Vera, "Le Loess," Revue de Géographie physique et de Géologie dynamique, Vol. VIII, No. 4, 1930.

The western region, which includes a large part of Ukraine, is the locality of the typical loess. To the north it is localized on the plateaux, while in the valleys it gives place to aqueous deposits. In the south, where the loess is better developed, attaining here, in fact its maximum development, it frequently covers the country with a continuous mantle, showing a thickness of twenty meters in some places. With the exception of the beds of fossil soil that it encloses, the loess is homogeneous throughout its mass.

The loess of the central region is often replaced by aqueous deposits.

The region to the southeast, the Caspian depression, does not show a true loess; its place is occupied by argillaceous silts associated with sand deposits of the Quaternary transgression of the Caspian.

According to Krokos,[1] the loess formations in Russia are divided into two complexes: the recent loess and the ancient loess. In the north, the recent loess is represented by at least two levels of loess-like formations. The upper level covers the deposits of the Würm moraines, and a lower level which in several places lies under these formations. In the region of Smolensk, the lower level of the loess is separated from the underlying Riss sands by a peat formation. The loess in its upper parts contains *Carpinus betulus*, *Corylus betulus*, etc., while the bottom parts contain *Brasenia purpurea*, *Trapa natans*, etc. In the neighborhood of Moscow the lower level of the recent loess contains *Elephas primigenius*, *Bos* sp., *Equus* sp., and in the region of Kaluga, near Lichvine, *Elephas primigenius* and *Rhinoceros tichorhinus* have been found.

Two levels of the recent loess are also found in the west of Russia, in the region occupied by the Riss glaciation (the Dnieper tongue). Each of these levels, but particularly the older level, often pass beneath aqueous deposits, or deposits of lacustrine loess. These two levels are generally superimposed and separated by a layer of fossil soil (first fossil soil of Krokos). They rest on the deposits of the Riss moraine but are kept from actual contact with these deposits by another layer of fossil soil (second fossil soil of Krokos). These relationships may be observed on the high terrace of the Dnieper.

These two levels of the recent loess along the Dnieper probably correspond to two separate advances of the Würm ice sheet—the lower level of the recent loess corresponding to Würm I, and the upper level to Würm II.

The typical loess of the central region is not as well known as the loess of the Dnieper area, but the geological and morphological characteristics allow one to suppose that the recent loess with two levels exists here also.

The following faunal types have been found in the upper level of the recent loess:

Elephas primigenius,*
Rhinoceros tichorhinus,*
Equus sp.,
Sus scrofa,
Cervus elaphus,
Cervus megaceros,
Cervus sp.,*
Rangifer tarandus,*
Saiga tartarica,
Ovibos sp.,*
Bos sp.,
Canis lupus,*
Vulpes vulpes,*
Vulpes lagopus,*

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[1] Krokos, V., "Stratigraphie der quartaren Ablagerungen der Ukraine," Die Quartarperiode, Vol. 4, 1922, Kiev, 1932, pp. 1–4.

Vulpes corsac,
Gulo sp.,*
Hyaena spelaea,
Ursus sp.,*
*Felis leo,**
Felis lynx,
Castor fiber,
Lepus sp.,*
Ochotona sp.,
*Citellus rufescens,**
Alactaya saliens,
Arvicola terrestris,
*Marmota bobac,**
Elobuis talpinus.

The asterisks indicate species which have been described in the loess itself, and which are encountered in the loams of the region of Voronezh. The other species, with the exception of the lynx, are also encountered in this last region, and have been found in the beds of the covering rock. The horse, deer, bear, polar fox, and rabbit are common to the loess and the covering beds.

The complex of the ancient loess is often separated into levels, the upper level being contemporaneous with the Riss glaciation and the lower level being pre-Riss. These two levels, frequently separated by a layer of fossil soil (third fossil soil at Krokos) pass laterally into loess-like fresh-water formations. Together with the Riss moraine they form the high terrace of the Dnieper.

The fresh water portion of the upper level contains the molluscs *Carbicula fluminalis* and *Paludina diluviana.* The vertebrates are represented by a single worn tooth of *Elephas trogontherii.*

No archaeological sites can be connected with this ancient loess complex.

10. River Terraces

It has been demonstrated that the formation of river terraces is closely connected with the sea level which controls the base of erosion of the rivers. Thus a lowering of the sea level (or an increase of continental elevation) would lower the base of erosion and cause the rivers to cut their valleys deeper and to start building new terraces. That this process was operative during Quaternary time is shown by numerous river terraces occupying different levels.

Pavlov [1] describes the results obtained by various investigators in correlating the river terraces with the Pleistocene glaciations. Thus, C. Depéret in the region of the Rhone has connected the four terraces found there with the four main glacial periods. These terraces have, starting at the top, been named Sicilian, Milazzian, Tyrrhenian and Monastirian. The Sicilian terrace lies 90–100 meters above the river level and is correlated with the Günz glaciation of the Alps. The Milazzian lies at an elevation of 55–60 meters and is connected with the Mindel glaciation of the Alps. The Tyrrhenian occurs at 28–30 meters and can be correlated with the Mindel-Riss inter-glacial period. The Monastirian lies at an elevation of 18–20 meters and corresponds to the moraines of the Würm glaciation.

The high terrace of the Dnieper, lying at an elevation of 20–30 meters, is described as Riss by Malycheff [2]; the low terrace, 14–15 meters above the river level, can be correlated with Würm, for in the upper valley of the Dnieper it passes laterally into the Würm fluvio-glacial deposits. Mirchink[1] describes three terraces on the Dnieper near Orsha: an upper terrace 40 meters above the present level of the Dnieper, a middle terrace at 20 meters, and a lower terrace at 10–12 meters.

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[1] Pavlov, A. P., "Dépôts néogènes et quaternaires de l'Europe mériodionale et orientale," Mémoir de la Section Géologique de la Société des Amis des Sciences Naturelles, d'Anthropologie et d'Ethnographie, 1925.

[2] Malycheff, Vera, "Le Loess," Revue de Géographie physique et de Géologie dynamique, Vol. VIII, No. 4, 1930.

11. Lacustrine Deposits of European Russia

The best known of the lake deposits in Russia are those of Lichvinsk, investigated by the geologist N. N. Bogolubov.[2] There it was proved definitely that the moraines of the fourth (Würm) glaciation did not reach the Kaluga region. The lake deposits were found under the moraine of the third (Riss) glaciation, the deposits themselves belonging to the second glaciation. Under the Riss moraine is, first of all, a layer of loess indicating the interglacial period. Beneath it are the lake deposits with numerous remains of buried fauna and flora; lower still are pebble sands of the second (Mindel) glaciation, the typical moraine of which was discovered near Kaluga, where two moraines divided by a layer of loess can be observed. According to the opinion of the investigator the lake deposits merged gradually and changed in an upward direction into loess, forming with it an organic whole. This shows that the lake deposits and the loess belong to the same epoch as the second interglacial period, being only its most ancient phase of deposition.

The flora of Lichvinsk lake bears witness to two climatic periods in the life of the lake: the earlier moderate, and the second warmer. During the first period the remains of *Picea excelsa* Lk., *Parix* sp., and *Salix* sp. were deposited in large quantity. Later appeared *Carpinus betulus*, *Taxus* sp., *Fagus* sp., and finally *Euryale europaea weberi*, the species of semi-desert regions. It is similar to *Euryale ferux* growing at the present time in Bengal, China, Japan, and on the shores of the river Ussury in Siberia. The mean temperature of the latter locality is −18° C. in January and 21° C. in July, averaging 4° C. for the year. This indicates that the climate was becoming warmer, surpassing the present day climate until it began to turn dry with a steppe character, returning to loess forming conditions. The fauna of the lake consisted for the most part of molluscs, fish, and the otter (*Lutra vulgaris*). But the most interesting species of fauna found in the loess were the remains of the mammoth (*Elephas trogontherii*) and rhinoceros (*Rhinoceros merckii*).

In central and southern Russia, many other lake deposits of this time exist; such are the lake deposits on the banks of the Moscow River, in the Studeniniy Gully, and the Troitzki Gully (both near Moscow) and other regions. In the Troitzk lake deposits, among the rich forest and lake fauna and flora, the whole skeleton of a mammoth was found which evidently had become bogged while watering and had died in the deep lake mud, being unable to extricate itself.[3]

In the region of the Caspian transgression, the lacustrine deposits, according to Chernishev,[4] may be described as follows: These deposits are found principally in the region of Viatka and are petrologically identical with the Caspian deposits. They represent fresh water deposits formed between the limits of Caspian transgression and the northern marine transgression. To these may be related the peat deposits. They are associated with clays and sands, with sphaerosiderite, and occupy a considerable expanse in the districts of Kotelnitch, Glagov and Slebodsk in the region of Viatka. The presence of peaty deposits of considerable thickness (60 to 70 meters) in these formations, and the fact that their extension does not coincide with the direction of the Viatka and other rivers leads one to believe that these formations do not correspond with the present river system, but that they represent sediments laid down by a system of lakes connected by a series of straits. Though petrologically these lacustrine deposits are similar to the deposits of the Caspian transgression they contain a fresh water fish fauna (*Alosa, Perca fluviatilis, Abremts brauma*) and molluscs (*Dreissena, Cyclas, Anodonta,* and *Paludina*), and a few rare remains of *Elephas primigenius* and rhinoceros.[1]

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[1] Mirchink, G. F., "Number of Glaciations of Russian Plains," "Priroda," No. 7–8, 1918.

[2] Bogolubov, N. N., "Materials for the Geological History of the Kaluga Region in the Glacial Period." "The Yearbook of Geology and Mineralogy of Russia," by N. N. Krishtafovich, Vol. VII, pp. 111–119.

[3] Gorodzov, V. A., "Archaeology, The Stone Age," Vol. I, Moscow, 1925.

[4] Chernishev, Th., "Aperçu sur les dépôts postérieurs en connection avec trouvailles des restes de la culture préhistorique au nord et à l'est de la Russie d'Europe," Congrés International d'Archéologie Préhistorique et d'Anthropologie, Moscow, 1892.

Nikitine [2] says of the lacustrine deposits of the Baltic region: "Lacustrine basins are found filled with stratified marly clay, sometimes arenaceous, in which are found a polar fauna; consequently these deposits were laid down at the beginning of the post-glacial epoch. These clays are usually covered by fresh water calcareous earth, passing in the upper part into carbonized vegetable matter." The lacustrine deposits of central Russia he cites as being particularly important because it is in them that many of the mammoth remains are found. These formations he believes can be correlated with the glacial pause or retreat.

12. Quaternary Fluvial Deposits

Chernishev describes the fluvial deposits of the Caspian region as follows: the fluvial beds, forming terraces in the old river valleys, are very distinct in the valleys of the Urals, where two terraces may be distinguished, the older and upper being post-Pliocene while the lower is composed of recent alluvium. Farther west the lower terrace divides in two. The more widespread of these formations is made up of a more or less sandy, calcareous, yellowish clay, usually distinctly stratified, both in the region of the Urals and in regions immediately adjacent. Sometimes this clay does not show an exact stratification; it is porous and contains calcareous concretions. Breaking up into escarped walls it often appears similar to loess; thus it is often termed "loessiforme." Related to the above, a bluish-gray and fawn colored clay, as well as a pebble conglomerate, is often found in the structure of the old fluvial terraces. Although this formation can be regarded as a constant horizon, the yellow clay (loessiforme) forms, in general, the upper horizon of the upper terrace, while the bluish-gray clays and pebble conglomerates form the lower part of the horizon. This formation attains its greatest development in the regions where the rivers ceased to be torrents on leaving the mountains, while the loessiforme deposits are often found well developed at elevations of 600 meters. In these beds in the upper terraces are found: *Elephas primigenius, Rhinoceros tichorhinus, Rhinoceros merckii, Bos priscus, Bos taurus,* and *Ovibos moschatus.* The period of formation of these deposits is the same as that of the Caspian transgression.

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[1] Chernishev, Th., "Aperçu sur les dépôts postérieurs en connection avec trouvailles des restes de la culture préhistorique au nord et à l'est de la Russie d'Europe," Congrés International d'Archéologie Préhistorique et d'Anthropologie, Moscow, 1892.

[2] Nikitine, S., "Sur la constitution des dépôts quaternaire en Russie et leurs relations aux trouvailles resultant de l'activité de l'homme préhistorique," Congrés International d'Archéologie Préhistorique et d'Anthropologie, Moscow, 1892.

In northern Russia, the fluvial deposits are represented by stratified sands intercalated with gravel and a few rare boulders. These sands show their best development where the rivers flowed into the Arctic Sea; they lie on the post-Pliocene marine beds. The fluvial deposits are clearly set off from the grayish marine formation by their clear yellow color. *Elephas primigenius* and *Rangifer tarandus* have been found in these sands (which testifies that the mammoth inhabited north European Russia at the same time that it inhabited northwestern Siberia, for its remains have been found in fresh water deposits in the region of the Yenisei River).

The alluvial deposits of the valleys which are exposed to the spring floods belong to this group of formations. In contradistinction to the valleys of the rivers of southeastern and southern Russia, the river valleys belonging to the basin of the Arctic Sea show only a weak development of terraces. The river valleys of this region are comparatively narrow and are bordered by abrupt escarpments of post-Pliocene beds.

13. Deposits of the Caspian Transgression

In southeastern Russia, in the west part of the region of Ufa, the southeastern part of the region of Viatka, and the central part of the region of Perm, are found the deposits of the Caspian transgression. The Caspian sediments change into the fluvial terrace sediments as one goes from west to east. The transgression took place by means of deep gulfs, following chiefly the ancient valleys of the Kama and the Bielaya Rivers. These gulfs were a complicated network of coves and bays in the western parts of the districts of Birsk and Menselinsk of the region of Ufa, and in the Kazan and Viatka regions as well as along the length of the Kama River. Through this region the following formations are represented by typical sections, commencing at the top:[1]

A. Fawn-yellow clay, stratified and containing marly concretions.
B. Gray stratified sand passing into gravel and conglomerates.
C. Plastic light gray clay, sandy at the base. In the middle of this clay one can observe layers of peat passing into lignite.

14. Boreal Marine Transgressions

With the freeing of Northern Russia from the great glaciers marine transgressions occurred. The deposits of these transgressions are represented by argillaceous sand beds and sandy clay beds of a brownish gray color, as well as by beds of dark gray clay, the latter is not a distinct horizon but is mutually intercalated with the former. In all these beds a similar fauna is found, resembling the fauna of the present Mourman Sea littoral. These sediments contain boulders of both igneous and sedimentary rocks often marked with striae. The material for these stratified deposits was furnished chiefly by Jurassic and Cretaceous formations. At its greatest extent the Arctic Sea encroached on the region of moraine formations in the form of deep gulfs, and changed the direction of the old valleys of the Dvina, Vaga, and Soukhona river systems.

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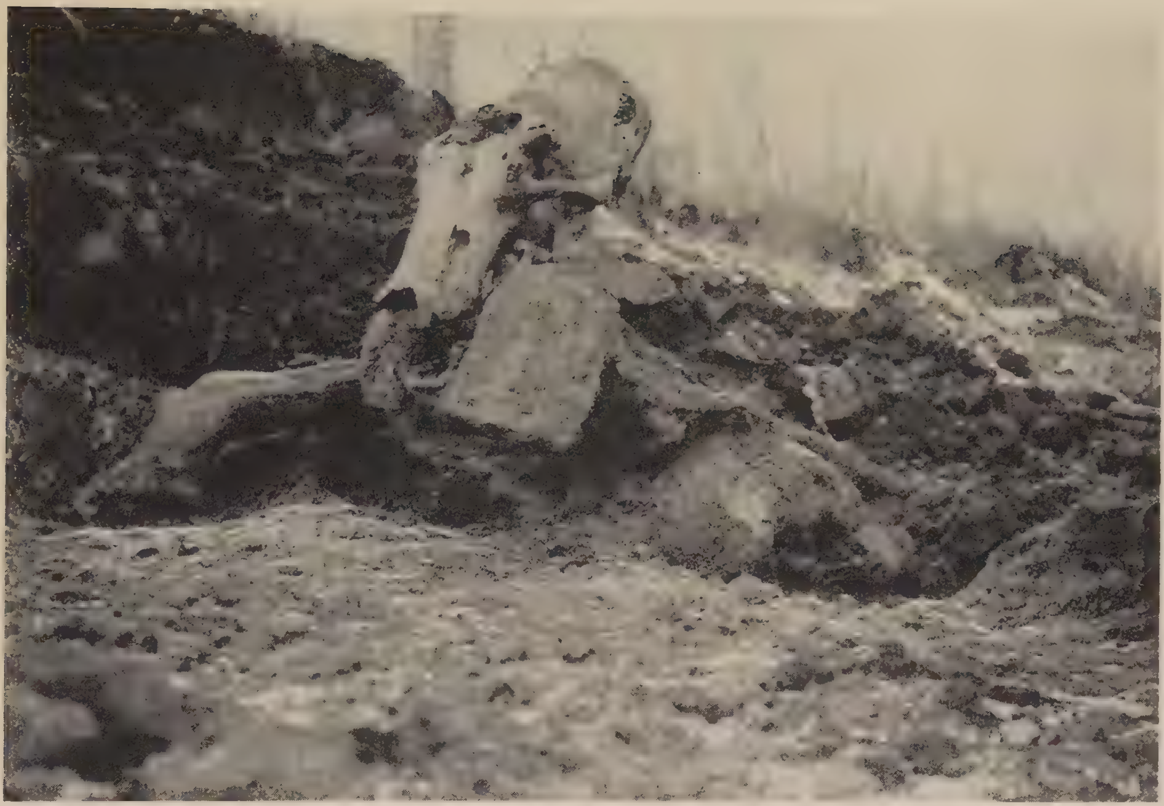
[1] Chernishev, Th., "Aperçu sur les dépôts posterieurs en connection avec trouvailles des restes de la culture préhistorique au nord et à l'est de la Russie d'Europe," Congrés International d'Archéologie Préhistorique et d'Anthropologie, Moscow, 1892.



Berezovka Mammoth in Process of Excavation. Photo courtesy of Zoological Museum of Academy of Sciences.

This transgression reworked and redeposited much of the moraine material of northern Russia. Many of the marine deposits contain striated pebbles and boulders. The fauna of these deposits includes shells of *Cyprina islandica, Astarte borealis, Cardium groenlandicum, Cardium islandicum*, and *Mactra elliptica;* this is a moderate Arctic fauna and is closely related to that of the present Mourman littoral. In the regions of the southwest, in the basin of the Vaga, abundant shells of *Cyrpina islandica* and *Cardium edule* are found. The main epoch of this transgression (as also the transgression of northwestern Siberia) corresponds in general to the epoch of the deposition of clays and sands with *Yoldia arctica* in Sweden.[1]

Chernishev also lists these formations:

A. Eluvial Formations. They are represented by sandy clay deposits developed on the flanks and summits of mountain chains. The non-stratified irregular masses of clay formations found in the broken surfaces of the carboniferous limestone also belong to this type of formation. To present a chronological classification of the eluvial deposits of the Urals and its vicinity is difficult; these deposits are characterized by no sorting of materials, and as they are due to chemical and mechanical disintegration *in situ,* they pass at various depths into the original parent rock. They are therefore represented by clays and sands containing debris from the disintegration of the rocks from which they were formed. Faunal traces are rare in these formations, though *Elephas primigenius* and *Bos priscus* have been found.

B. Aeolian Formations. These are represented by a range of dunes on the littoral of the Arctic Sea and in the large valleys of the great rivers, the Pechora, the Vichegda, the Dvina, and others.

C. The Cave Deposits of the Ural Region. These are of interest to archaeologists. Their floors are composed of clay containing rock debris from the cave roofs. The character of these clays would seem to show that they are the results of inundation; in them have been found *Bos priscus, Cervus alces,* etc.[2]

15. Vertebrate Fauna of the Quaternary Period

The following description of the Quaternary fauna of the Ukraine has been taken from a paper by J. G. Pidoplichka.[3]

The data on the Quaternary fauna is apt to be poor, because to date insufficient work has been done on them, and also because the loess formations are not a favorable medium for the preservation of skeletal remains, particularly those of small animals.[4]

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[1] Chernishev, Th., "Aperçu sur les dépôts postérieurs en connection avec trouvailles des restes de la culture préhistorique au nord et à l'est de la Russie d'Europe," Congrés International d'Archéologie Préhistorique et d'Anthropologie.

[2] Further brief petrological description of the Quaternary deposits are given in the "Map of the Quaternary Deposits of the European Part of the U.S.S.R. and the Adjacent Regions," Explanatory Note, Leningrad, 1932.

[3] Pidoplichka, J. G., "Die Fauna der Quartaren Saugetiere der Ukraine," Die Quartarperiode, Ukrainische Akademie der Wissenschaften, No. 4, 1932.

[4] The unusually well preserved mammoth remains from Siberia (Plates I–VI) have been described fully. See also: E. Golomshtok, "Le Trompe du Mammouth Sibérien," L'Anthropologie, t. XLII, no. 5–6, 1932, 548–550.

Fifth loess (Gunz): in this horizon no strictly dated conclusions as to faunal types can be drawn.

Fourth loess (Mindel) and fourth fossil bed (Gunz-Mindel): in 1927 Krokos assigned to this period the mammals of the Tiraspolian gravels; that is, the terrace depositions of the old Dniester. At present, this demands further proof.

Third fossil bed (Mindel-Riss): no mammalian remains have been found in the fossil bed of this period in Ukraine. However, in the sands of this period *Elephas trogontherii* has been found near Melnyk at Kaniev. The remains of this same animal have also been found at the village of Lyssa Gora in the neighborhood of Pervomaiska. The sand in which these finds were made is located beneath the third loess horizon (counting from the top).

Third loess (Riss): the faunal contents of this horizon are inadequately known. Krokos reports finding the remains of *Elephas primigenius* in the sub-moraine sands near the village of Kovali near Lubni. To this stratum may also be assigned remains of *Marmota* sp. found in Dorenburg, near Askania Nova. *Ursus spelaeus rossicus,* Boriss has been reported from this loess at Lubimovka near Chersov.

Second fossil bed (Riss-Würm): this horizon in the Ukraine has not been well investigated. However, to this period belong such steppe animals in western Europe as:

Equus hemionus,
Cricetulus migratorius,
Saiga tatarica,
Alactaga jaculus.

Second loess (Würm I): At present few finds can be assigned to this period. The remains of *Spalax* and other burrowing animals have been found.

The fauna of the Crimean caves is mixed. The presence of *Vulpes logopus* and *Rangifer tarandus* (lower Aurignacian) indicates the immediate influence of the neighboring tundra fauna (Mezine), while the presence of many steppe animals, among them *Alactaga jaculus* and *Hyaena spelaea,* bears witness to the southern character of the Crimean fauna.

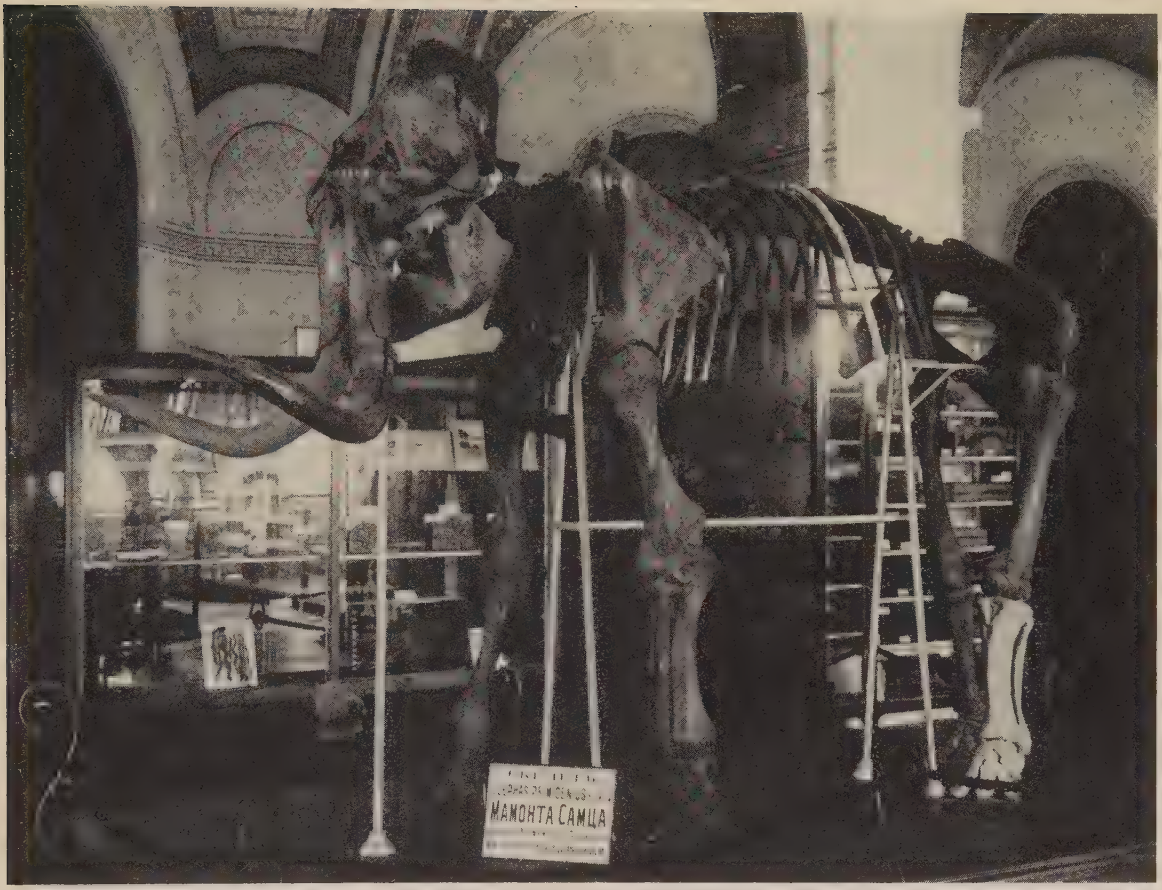
The fauna of the first fossil bed (Würm interstadial) has been subjected to close examination as the result of excavations that have been carried out at the palaeolithic sites of Mezine and Zuravka. Conclusions regarding the distribution of the mammalian types of this horizon were also made possible by the investigations of Bialinitzky-Birulya in the Crimea. The fauna of the Mezine site shows classical tundra forms:

Elephas primigenius,
Rhinoceros tichorhinus,
Equus caballus,
Bos sp.,
Rangifer tarandus,
Vulpes lagopus,
Lepus timidus,
Citellus rufescens,
Dicrostonyx torquatus,
Gulo gulo,
Ovibus moschatus.

The fauna of the Palaeolithic site of Zuravka is an arctic tundra fauna, namely:

Elephas primigenius,
Rangifer tarandus,
Saiga tatarica,
Marmota bobak,
Citellus rufescens.

PLATE II.


МАМОНТА САМЦА

Berezovka Mammoth in the Zoological Museum of U.S.S.R. Academy of Sciences. Photo courtesy of Zoological Museum.

Examination has shown the first loess horizon (Würm II) to contain the faunal remains listed below:

- *Meles meles,*
- *Ochotona pusilla,*
- *Marmota bobak,*
- *Citellus citellus,*
- *Citellus suslicus,*
- *Citellus pigmaeus,*
- *Cricetus cricetus,*
- *Spalax microphtalmus,*
- *Spalax polonicus,*
- *Microtus arvalis,*
- *Cricetulus migratorius,*
- *Silvimus silvaticus,*
- *Vormela sarmatica,*
- *Putorius eversmanni.*

With the exception of *Ochotona pusilla* all the forms in the foregoing list have still living representatives. The late Würm loess-free terrace of the Dnieper has also shown *Cervus megaceros hibernicus.*

TABLE II.

	Mousterian		Aurignacian		Proto-Solutrean	Magdalenian		
	Crimea	Caucasus	Crimea	Central Russia		Early	Middle	Late
1. *Elephas primigenius*	×	×	×	×	×	×	×	.....
2. *Rhinoceros tichorhinus*	×	×	×	×	.....	traces	.....	.....
3. *Equus caballus*	×	×	×	×	×	×	.....	.....
4. *Equus hemionus*	×	.....	.....	×	.....	.....	.....	×
5. *Equus asinus*	×	×	.....	.....	.....	.....	.....	.....
6. *Sus scrofa*	×	×	×	.....	×	×	.....	.....
7. *Bos* (species)	×	.....	×	×	×	×	×	.....
8. *Cervus elaphus*	×	×	×	.....	×	×	.....	×
9. *Cervus megaceros*	×	×	×	.....	.....	.....	.....	.....
10. *Rangifer tarandus*	.....	.....	×	×	×	×	×	×
11. *Capreolus* (species)	×	.....	.....	.....	.....	.....	.....	.....
12. *Saiga tatarica*	×	.....	×	.....	.....	.....	.....	.....
13. *Canis lupus*	×	×	×	×	×	×	.....	.....
14. *Canis familiaris*	.....	.....	.....	.....	.....	.....	.....	×
15. *Vulpes vulpes*	.....	.....	×	.....	.....	.....	×	.....
16. *Vulpes lagopus*	×	.....	×	.....	.....	.....	×	.....
17. *Vulpes corsac*	×	.....	×	.....	.....	.....	.....	.....
18. *Meles meles*	×	.....	.....	.....	.....	.....	.....	.....
19. *Martes foina*	.....	.....	.....	.....	.....	.....	.....	.....
20. *Putorius evesmanni*	.....	.....	×	.....	.....	.....	.....	.....
21. *Putorius ermineus*	.....	.....	×	.....	.....	.....	.....	.....
22. *Putorius nivalis*	.....	.....	×	.....	.....	.....	.....	.....
23. *Ursus arctos*	.....	.....	.....	.....	.....	×	.....	.....
24. *Ursus spelaeus*	.....	×	×	.....	×	.....	.....	.....
25. *Felis leo*	×	.....	.....	.....	.....	.....	.....	.....
26. *Felis lynx*	×	.....	.....	.....	.....	.....	.....	.....
27. *Felis silvestris*	.....	.....	.....	.....	.....	.....	.....	.....
28. *Hyaena spelaea*	.....	×	×	.....	.....	.....	.....	.....
29. *Lepus europeus*	×	..	.....	.....	.....	×	.....	.....

TABLE II (*Continued*)

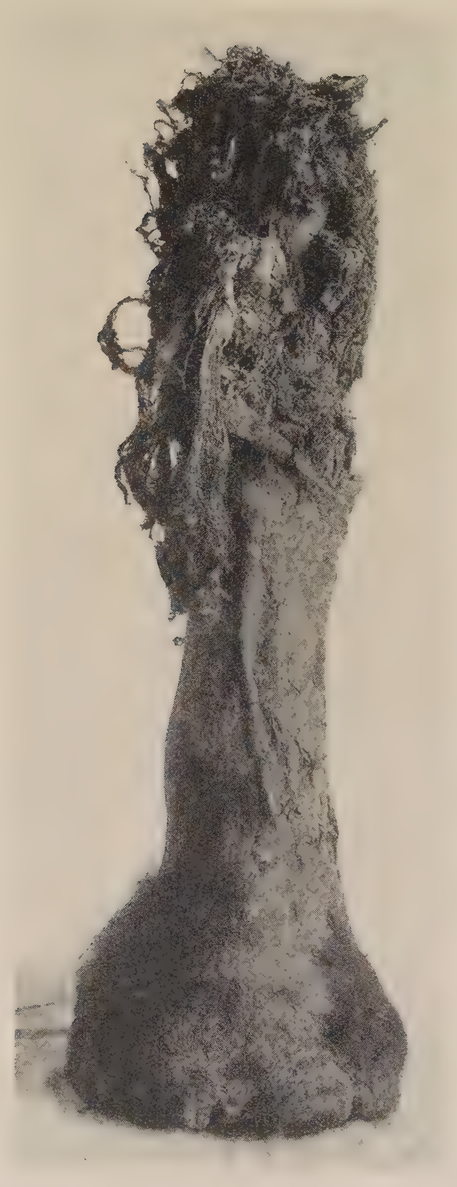
	Mousterian		Aurignacian		Proto-Solutrean	Magdalenian		
	Crimea	Caucasus	Crimea	Central Russia		Early	Middle	Late
30. *Lepus timidus*	×		×		×			sp.
31. *Ochotona pusilla*			×					
32. *Marmota bobac*	×		×	×	×	×		
33. *Citellus rufescens*	×		×	×	×			
34. *Castor fiber*			×					
35. *Cricetus cricetus*	×		×	×				
36. *Cricetus* (*Mesocricetus*) sp.			×					
37. *Cricetus* (*Cricetulus*) sp.			×					
38. *Mus sylvaticus*	×		×					
39. *Arvicola amphibius*	×		×					
40. *Microtus arvalis*			×	×				
41. *Evotomys glareolus*			×					
42. *Lagurus luteus*	×		×					
43. *Ellobius talpinus*	×		×			×		
44. *Alactaga jaculus*			×					
45. *Alactaga elater*			×					
46. *Scirtopoda telum*			×					
47. *Bison* (*priscus*)		×		×	×	×		
48. *Spalax microphtalmus*				×	×			×
49. *Vermella perugusna*				×				
50. *Alopex lagopus*					×	×		×
51. *Ovibos moschatus*						×		
52. *Dicrostonyx torquatus*						×		
53. *Alces alces*						×	×	
54. *Antelope* (species)							×	
55. *Ursus* (species)							×	
56. *Vulpes* (species)							×	
57. *Gulo gulo*								

Many animals have become extinct in historical times. These may be listed as follows:

Equus prjewalskii,
Bos primigenius,
Bison bonasus,
Cervus elaphus,
Saiga tatarica,
Ursus arctos,
Gulo gulo,
Vulpes corsak,
Alactagulus acontion.

Further faunal listings may be given in conjunction with the various culture periods found in Russia. The correlation of these different cultures with the glacial and interglacial periods may be made as follows: Mousterian covers late Riss-Würm to early Würm; Aurignacian to full Magdalenian may be taken to occupy the rest of Würm. The final stages of Magdalenian may be taken as extending over into post-glacial time.

The faunal remains of the Caucasus are on the whole similar to those of the Crimea, though the latter does show a wider variety of small animals. This may perhaps be ex-



Leg of Berezovka Mammoth. Photo courtesy of Zoological Museum of U.S.S.R. Academy of Sciences.

plained on the grounds that environmental conditions were more favorable for the preservation of the bones of the small mammals in the Crimea. If conditions are unfavorable for preservation, small bones tend to be destroyed more rapidly than large ones. This fact may explain the scarcity of small bones in the Caucasus.

16. Invertebrate Fauna of the Quaternary Period

The following table (III, pp. 224–228 inclusive) of invertebrate fauna for Ukraine have been taken from the work of W. G. Bondartchuk.[1]

17. Flora of the Quaternary Period

J. D. Kleopov [2] gives the following divisions of the Quaternary flora for the Ukraine:

1. Alpine fossil types of Riss age.
2. Mesophile fossils of forest type belonging to the Riss-Würm period.
3. Xerophile fossils of the dry loess-forming period contemporaneous with Würm.
4. Boreal fossils of types belonging to the close of Würm and the post-glacial periods.

Some Alpine types of fossil species of the deep plains are classified (according to the system of Litvinov) with the glacial fossils. Such species may be listed as follows:

Androsace villosa,
Daphne cneorum (including *D. Julia* K.-Pol.),
Schiwereckia podolica,
Anemone narcissiflora,
Bupleurum ranunculoides (*Rasse multinerve*),
Chrysanthemum sibiricum (*Rasse alaunicum*),
Potentilla pimpinelloides,
Woodsia alpina,
Polygonum alpinum,
Cynanchum minus,
Rhododendron flavum.

Some of these forms existed in the Tertiary and have existed down to the present day. The Riss glaciation drove this flora into the Donetz region and the Podol-Volyn region where the ice did not penetrate.

The mesophile flora includes the following scattered forest species in the broad sense:

Orobus variegatus,
Coronilla elegans,
Arabis turrita,
Callamintha officinalis,
Myosotis idaea ucrainica,
Evonymus nana,
Erysimum aureum,
Lysimachia verticillata,
Physospermum cornubiense,
Silaus peucedanoides,
Cynanchum scandens,
Laserpitium hispidum,
Arum orientale,
Equisetum maximum,
Polystichum braunii,
Geranium phaeum,
Anthriscusnitidus,
Symphytum.

The Xerophile species include examples from the loess island-like stands as the *Gypsophila altissima*, and *Kochia prostrata* of the chalk cliffs of the Toltra mountains and the steep banks of the Dniester near the Podolian forest division, as well as the stony steppe

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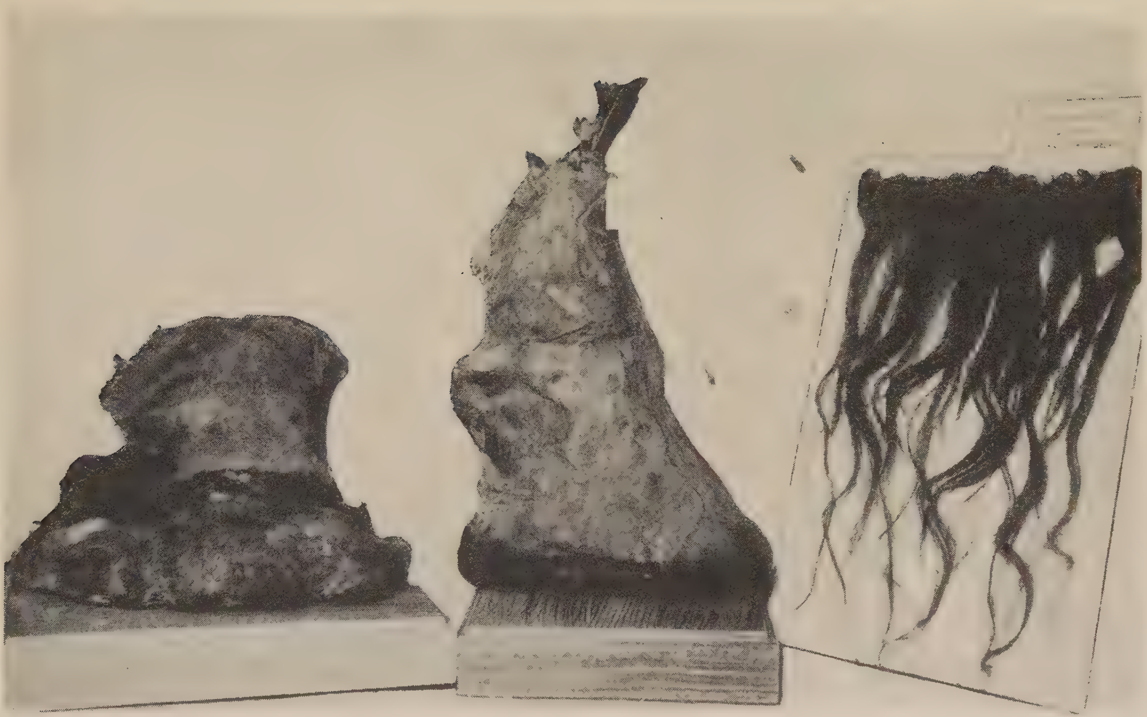
[1] Bondartchuk, W. J., "Die Fauna der Quartaren Ablagerungen der Ukraine S. S. R.," Die Quartarperiode, Ukrainische Akademie der Wissenschaften, 1932, No. 4.

[2] Kleopov, J. D., "Über das Alter der Relikte der Ukraine in Konnex mit der Sukzession in ihrer Vegetation im Laufe der Quartarzeit," Die Quartarperiode, Ukrainische Akademie der Wissenschaften, 1932, No. 4.

TABLE III. Invertebrate Faunal Species

	1. Fifth loess.	2. Fourth loess.	3. Caspian formations.	4. Alluvium of fourth terrace.	5. Submoraine part of third loess.	6. Fresh water clay contm. with third loess.	7. Moraine and glacial lakes.	8. Upper moraine part of third loess.	9. Alluvium of third terrace.	10. Second loess.	11. Alluvium of second terrace.	12. First loess.	13. Alluvium of first terrace.
1. *Hyalinia cristalina* Sand.				+									
2. *Zonitoides nitidus* Mull.													+
3. *Zonit ammonis* Str.											+		+
4. *Agriolimax agrestis* Lin.													+
5. *Monacha rubiginosa* Schm.					+					+		+	
6. *Euconulus trochiformis*					+								+
7. *Coniodiscus ruderatus* Stud.							+						
8. *Punctum pigmeum* Drap.													
9. *Euolota fruticum* Mull.					+								
10. *Helicella striata* Mull.												+	
11. *H. ericetorum* Mull.					+								
12. *H. arenosa* Kryn.												+	
13. *Xerophilla deyecta* San.												+	
14. *Fruticicola hispida* Brann.	+	+	+				+						
15. *Fruticicola hispida* v. *septentrionalis*	+							+					
16. *Helix strigela* Drap.				+									
17. *Clausilia dubia* Drap.				+									
18. *Succinea putris* Lin.		+			+			+	+	+			
19. *S. elegans* Riss.					+								
20. *S. pfeifferi* Rossm.	+	+	+		+	+		+	+	+	+	+	+
21. *S. oblonga* Drap.	+	+	+	+	+	+	+	+	+	+	+	+	+
22. *S. oblonga* v. *elongata* Sand.	+	+								+		+	
23. *Vallonia pulchella* Mull.												+	+
24. *V. costata* Mull.									+			+	+
25. *V. tenuilabris* Braun	+	+			+		+	+		+		+	
26. *V. vall.* aff. *adela* West.					+								
27. *Vertigo autivertigo* Drap.													+
28. *V. substriata*											+		
29. *V. genesii* Gredler										+			
30. *V. parcedentata* Sand.					+					+			
31. *V. pygmaea* Drap.					+								
32. *Columella edent. col.* Mart.					+					+			
33. *C. edentula* Drap.		+			+							+	
34. *C. columella* Mart.	+							+				+	



PARTS OF BEREZOVKA MAMMOTH. Photo courtesy of Zoological Museum of U.S.S.R. Academy of Sciences.

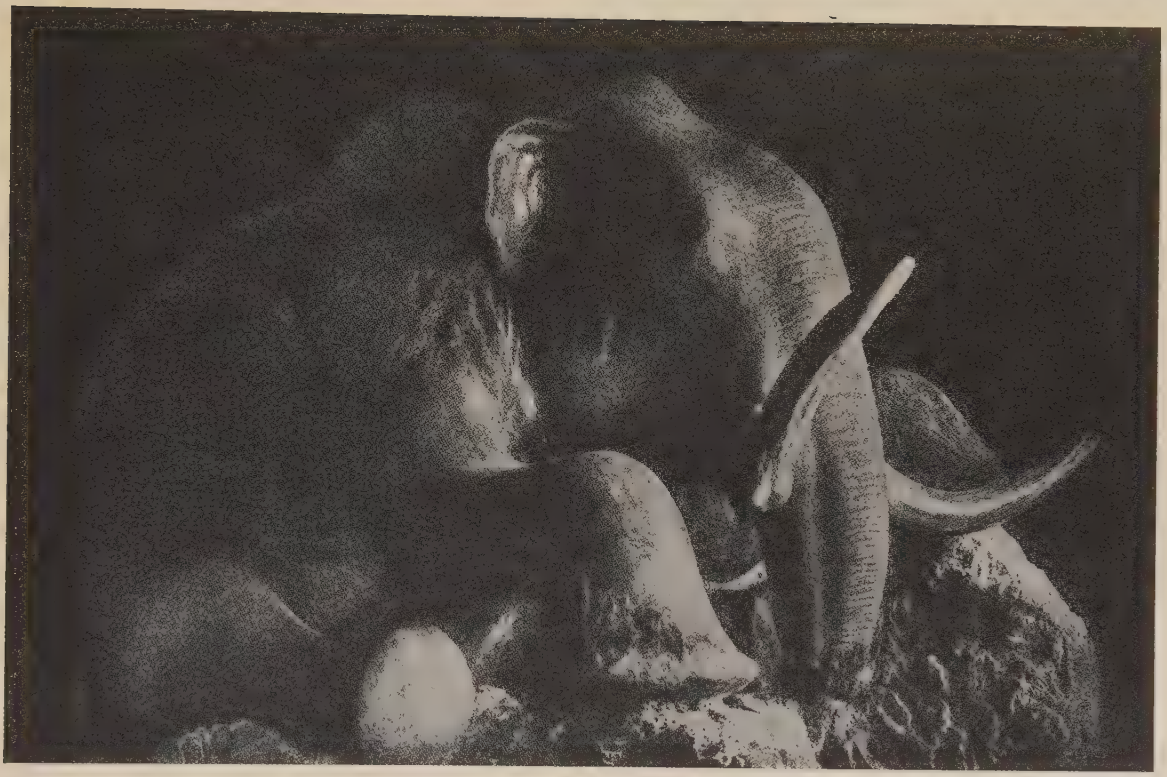
TABLE III (*Continued*)

	1. Fifth loess.	2. Fourth loess.	3. Caspian formations.	4. Alluvium of fourth terrace.	5. Submoraine part of third loess.	6. Fresh water clay contm. with third loess.	7. Moraine and glacial lakes.	8. Upper moraine part of third loess.	9. Alluvium of third terrace.	10. Second loess.	11. Alluvium of second terrace.	12. First loess.	13. Alluvium of first terrace.
35. *Pupilla muscorum* Mull.	+	+	...	...	...	...	...	...	...	...	...	...	...
36. *P. muscorum* v. *edentula*	...	...	...	...	+	...	...	+	+	+	+	+	...
37. *P. musc.* v. *unidentata* Pf.	...	...	...	...	+	...	...	...	...	+	...	+	...
38. *P. cupa* Voit.	...	...	...	...	...	...	...	...	...	...	...	+	...
39. *Chondrina avenacea* Brug.	...	...	...	...	+	...	...	...	...	...	...	...	...
40. *Pupa minutissima* Hal.	...	...	...	+	...	...	...	...	...	...	...	...	...
41. *Fruncatulina cylindrica* Fer.	...	...	...	...	...	...	+	...	...	...	...	...	...
42. *Zebrina detrita* Mull.	...	...	...	...	...	...	...	...	...	...	...	+	...
43. *Chondrula tridens* Mull.	...	...	...	...	+	...	...	...	...	...	...	+	...
44. *Cochlicopa lubrica* Mull.	...	...	...	...	...	...	...	...	...	...	...	+	+
45. *Corichium minimum*	...	...	...	...	...	...	...	...	...	...	...	...	+
46. *Lymnaea stagnalis* Mull.	...	...	...	...	...	...	...	...	...	...	...	...	+
47. *Radix auricularia* Lin.	...	...	...	...	...	+	...	...	...	...	...	...	...
48. *R. ovata* Drap.	...	...	...	...	...	...	...	...	+	...	...	+	+
49. *R. ovata fontinalis* Geyer	...	...	...	...	...	...	...	+	+	...	...	...	...
50. *Stagnicola palustris* Mull.	...	...	+	+	+	+	...	+	...	...	...	+	+
51. *S.* v. *fusca* Pfeiff.	+	+	+	...	...	...	...	...	+	...	+	+	...
52. *S.* v. *curta* Cless.	...	...	...	...	...	...	...	...	...	...	...	...	...
53. *S.* v. *tunicula* Held.	...	...	...	...	...	...	...	...	...	...	...	+	+
54. *S.* v. *septentrionalis*	+	+	...	...	...	...	...	...	+	...	+	...	...
55. *Leptolimnaea glabra* Mull.	...	...	...	...	...	+	...	+	...	...	...	+	...
56. *Galba truncatula* Mull.	...	...	...	...	+	+	...	...	+	+	+	+	...
57. *Coretus corneus* Lin.	...	...	+	+	...	+	...	...	+	...	...	...	...
58. *Planorbis carinatus* Mull.	...	...	...	...	+	...	...	...	...	...	...	...	...
59. *P. planorbis* Lin.	+	+	+	+	+	...	...	+	+	+	+	+	+
60. *P. marqinatus* Lin.	...	...	...	+	...	...	...	...	...	...	...	...	...
61. *P. micromphalus*	...	...	...	+	...	...	...	...	...	...	...	...	...
62. *Armiger nautileus*	...	...	...	...	...	...	...	+	...	...	...	...	...
63. *Spiralina vortex* Lin.	...	...	...	...	...	...	...	...	+	...	...	...	+
64. *S.* v. *compressa* Mith.	...	...	...	...	...	...	...	...	...	...	...	+	...
65. *Paraspira spirobis* Lin.	...	...	+	+	+	+	...	...	+	+	...	+	...
66. *P. bucostoma* Mith.	+	+	+	...	+	...	...	+	+	+	...	+	...
67. *P. septemgyrata* Zicq.	...	...	...	...	...	...	...	...	...	...	...	+	...
68. *Gyraulus albus* Mull.	...	...	...	...	+	+	+	...	...	...	+	+	+

TABLE III (*Continued*)

	1. Fifth loess.	2. Fourth loess.	3. Caspian formations.	4. Alluvium of fourth terrace.	5. Submoraine part of third loess.	6. Fresh water clay contm. with third loess.	7. Moraine and glacial lakes.	8. Upper moraine part of third loess.	9. Alluvium of third terrace.	10. Second loess.	11. Alluvium of second terrace.	12. First loess.	13. Alluvium of first terrace.
69. *G. gudleri* Gredl.	+	+	...	...	...	...	+	+	...	+	...	+	...
70. *G. rossmaessleri* Auerw.	...	...	...	...	+	...	...	...	...	+	...	+	...
71. *G. laevis* Aldlr.	...	...	...	...	...	+	...	...	...	...	...	...	...
72. *Bethyomph contortus* Lin.	+	+	...	...	...	+	...	+	+	...	+	+	+
73. *Segmentina nitida* Mull.	...	...	+	...	...	+	...	...	+	+	...	...	...
74. *Ancylus fluviatilis* Mull.	...	...	...	+	...	...	...	...	...	...	...	...	...
75. *A. involutus* Pav.	...	...	...	+	...	...	...	...	...	...	...	...	...
76. *Acrolotus lacustris* Lin.	...	...	...	...	...	...	...	...	...	...	...	...	+
77. *Physa fontinalis* Lin.	...	...	...	...	...	...	...	...	...	...	...	...	+
78. *Plexa hipitorum* Lin.	...	...	...	...	...	...	...	+	...	...	...	+	...
79. *Valvata piscinalis* Mull.	...	...	...	...	...	...	...	...	+	...	+	...	+
80. *V.* v. *antiqua* Sow.	...	...	+	+	...	...	...	...	+	...	...	...	...
81. *V. pulchella* Stud.	+	+	+	...	...	...	...	+	+	...	...	...	+
82. *V. cristata* Mull.	...	...	...	...	...	+	...	...	...	...	...	...	...
83. *V. macrostoma* Sand.	...	...	...	+	...	+	...	...	...	...	...	...	...
84. *V. sulekiana* Bruss.	...	...	...	+	...	...	...	...	...	...	...	...	+
85. *Paludina fasciata* Mull.	...	...	...	...	...	...	...	...	+	...	...	...	...
86. *P. soxolovi* Pav.	...	...	+	+	...	...	...	...	+	...	...	...	...
87. *P. zickendrathi* Pav.	...	...	+	+	...	...	...	...	+	...	...	...	...
88. *P. istriena* Pav.	...	...	+	+	...	...	...	...	...	...	...	...	...
89. *P. diluviana* v. *crassa* Kunt.	...	...	+	+	...	...	...	...	...	...	...	...	...
90. *P. diluviana* v. *gracilis* Kunt.	...	...	+	+	...	...	...	...	...	...	...	...	...
91. *P. romaloi* Cob.	...	...	+	+	...	...	...	...	...	...	...	...	+
92. *P. getica* Pav.	...	...	...	+	...	...	...	...	+	...	...	...	...
93. *P. achatinoides* Desh.	...	...	+	...	...	...	...	...	...	...	...	...	...
94. *P. pseudoachatinoides* Pav.	...	...	+	+	...	...	...	...	...	...	...	...	...
95. *P. achatinoides* Desh.	...	...	...	...	...	...	...	...	+	...	...	...	...
96. *P. subconcinna* Sinz.	...	...	+	...	...	...	...	...	...	...	...	...	...
97. *P. sinzovi* Pav.	...	...	+	...	...	...	...	...	...	...	...	...	...
98. *P. tanaitica* Boudar.	...	...	+	...	...	...	...	...	...	...	...	...	...
99. *P. bugensis* Boudar.	...	...	+	...	...	...	...	...	...	...	...	...	...
100. *P. pseudoneumayri* Pav.	...	...	+	...	...	...	...	...	...	...	...	...	...
101. *P. obtusa*	...	...	+	...	...	...	...	...	...	...	...	...	...
102. *P. hungarica* Sabba.	...	...	+	...	...	...	...	...	...	...	...	...	...

PLATE V.



Mounted Mammoth from Berezovka. After Vishnevky.

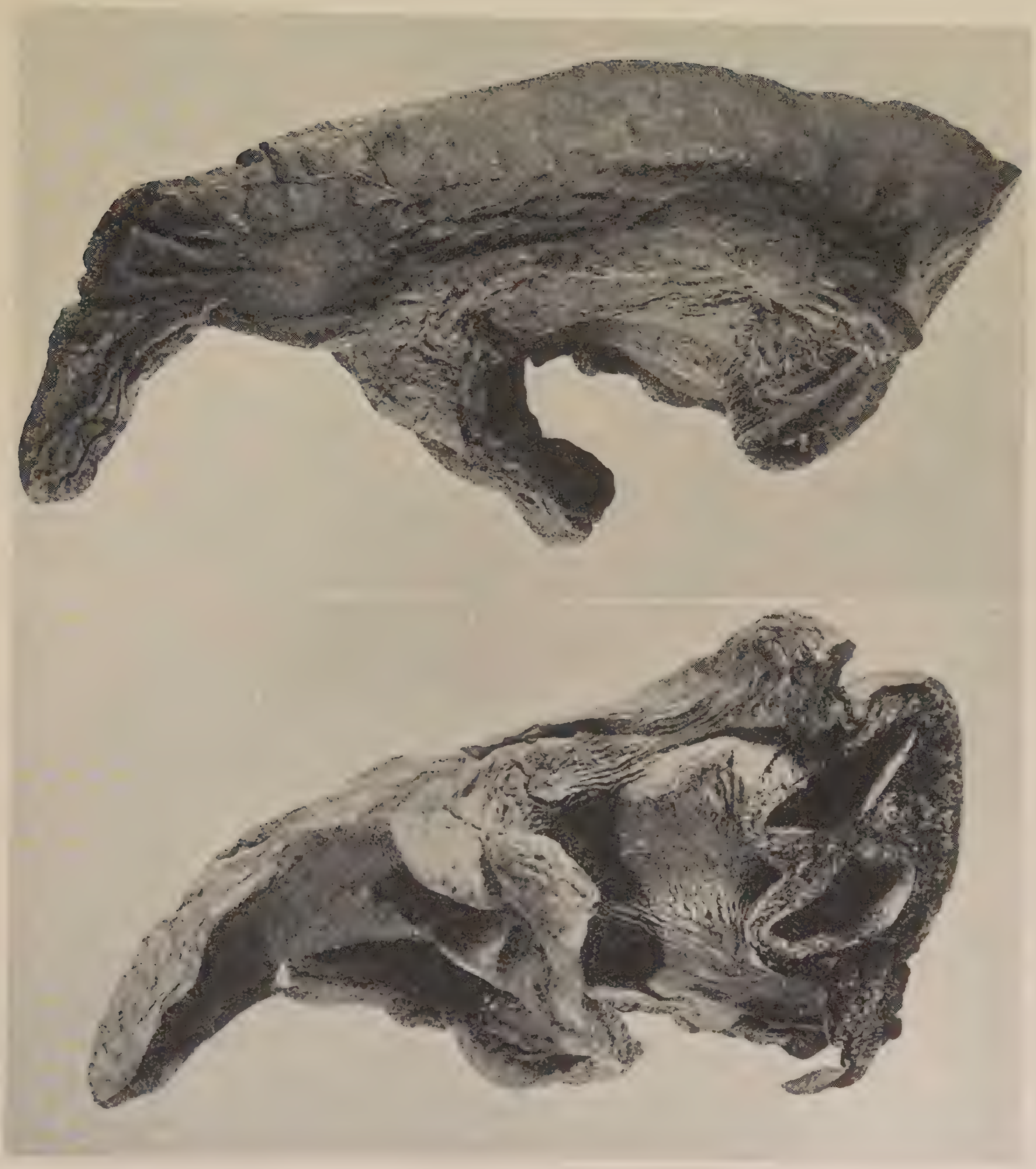
TABLE III (*Continued*)

	1. Fifth loess.	2. Fourth loess.	3. Caspian formations.	4. Alluvium of fourth terrace.	5. Submoraine part of third loess.	6. Fresh water clay contm. with third loess.	7. Moraine and glacial lakes.	8. Upper moraine part of third loess.	9. Alluvium of third terrace.	10. Second loess.	11. Alluvium of second terrace.	12. First loess.	13. Alluvium of first terrace.
103. *Paludina dresseli* Tourn.			+										
104. *P. contecta* Pav.			+										
105. *P. cretzestiensis* Pav.			+										+
106. *P. murgescki* Sabba			+										
107. *P. bockhi* Hal.			+	+									
108. *P. aethiops* Pav.			+	+									
109. *P. mammata* Sabba			+	+					+				
110. *P. tiraspolitana* Pav.				+									
111. *P. costae* Held													
112. *P. rodensis* Pav.												+	
113. *Bithynia tentaculata* Lin.				+									
114. *B. leachi* Schep.	+		+			+		+	+		+		
115. *B. spoliata* Sabba			+										
116. *Lythoglyphus naticoides* Pf.			+	+									+
117. *L. mumayri* Sabba			+	+									+
118. *L. michaeli* Hal.				+									
119. *Melanopsis acicularis* Fer.			+										
120. *M. esperoides* Sabba			+	+									
121. *M. cotrocensis* Cob.				+									
122. *Theodoxus fluviatis* Lin.													+
123. *Neretina serra filiniformis* Gel.				+									
124. *N. transversalis* Pfeuff.				+									
125. *N. scripta* Sabba				+									
126. *N. licherdopoli* Sabba				+									
127. *N. semiplicata* Hal.				+									
128. *Unio pictorum* Lin.													+
129. *U. tumidus* Retz			+	+									+
130. *U. crassus* Retz			+	+									+
131. *U. batavus haassica* Haas			+	+									
132. *U. batavus pseudocrassus* Rossm.			+	±									
133. *U. cubranollici* Brus.				+									
134. *U. kungurensis* Rossm.			+	+									
135. *U. rumanus* Tour.			+	+							+		
136. *Unio* sp.						+			+				

TABLE III (*Continued*)

	1. Fifth loess.	2. Fourth loess.	3. Caspian formations.	4. Alluvium of fourth terrace.	5. Submoraine part of third loess.	6. Fresh water clay contm. with third loess.	7. Moraine and glacial lakes.	8. Upper moraine part of third loess.	9. Alluvium of third terrace.	10. Second loess.	11. Alluvium of second terrace.	12. First loess.	13. Alluvium of first terrace.
137. *Anodonta* sp.			+	+									+
138. *Cyclas rivicola* Lam.			+	+		+			+				+
139. *Sphaerium solidum* Nor.				+									
140. *Corbicula fluminalis*			+	+									
141. *Corb. jassiensis* Cob.			+	+									
142. *Dreissensia polymorpha* Pall.			+	+									+
143. *D.* v. *miusica* Bondar.			±										
144. *D.* v. *nova* Andr.			+										
145. *D.* v. *etima* Andr.			+										
146. *D.* v. *regularis* Pall.			+										
147. *D.* v. *marina* Pall.			+										
148. *D.* v. *occidentalis* Sabb.			+										
149. *D.* v. *fluviatilis* Pall.			+										
150. *D.* v. *latior* Andr.			+										
151. *D.* v. *oblonga* Andr.			+										
152. *D. retovskii* Andr.			+										
153. *D. rostriformis* Desh.			+										
154. *D. caspia* Eichw.			+										
155. *D. crassa* Andr.			+										
156. *D. eichwaldi*			+										
157. *D. semilimaris*				+									
158. *Pisidium amnicum* Mull.				+					+				
159. *P. casertanum* Poll.													+
160. *P. substriatum* Malm.						+			+				
161. *P. nitidum* Mull.									+				
162. *P. obtusale* Pfeiff.			+			+			+		+	+	+
163. *P. hibernicum* West.									+				
164. *P. tenuilineatum* Stef.							+						
165. *Pisidium* sp.	+						+						
166. *Didacna rudis* Naliv.			+										
167. *D. crassa* Eichw.			+										
168. *D. pseudocrassa* Pav.			+										
169. *Monodacna colorata* Eich.			+										

PLATE VI.



Mammoth Trunk Found in Siberia. Photo courtesy of Zoological Museum of U.S.S.R. Academy of Sciences.

regions. The majority of the Xerophile species tend to the Mediterranean, especially to the east and in the neighborhood of Bulgaria. Species in this region may be listed as follows:

Dianthus pseudoarmeria,
Silene supine,
Silene compacta,
Pimpinella tragium s.l.,
Zizyphora teniuor,
Jurinea stoechadifolia,
Teucrium polium,
Alyssum tortuosum,
Silene cyri (including *S. hellmanii*),
Alsine glomerata,
Arenaria rigida,
Trinia hispida.

In the Ural-Caspian region the following species are found:

Silene sibirica,
Gypsophila altissima,
Geranium linearilobum,
Caragana grandiflora (including *C. scythica*),
Caragana frutex.

The majority of the Xerophile migrated to the steppe regions during the loess deposition of the various glacial periods, though by far the greatest number of this group are found in the Würm.

The boreal fossils are of north Asiatic origin; they are scattered island-like in the forest steppes, and the steppes along the Samara and the Donetz. For the greatest part they are not connected with the large river terraces. The following plants may be listed as typical: *Pinguicula vulgaris, Saxifraga hirculus, Vaccinium myrtillus,* and *Vaccinium vitisidaea.* The moss series of Podolia are to be considered as belonging to post-glacial times.

18. Conclusions

On the basis of the foregoing data, the existence of only three definitely traceable glaciations, Mindel, Riss and Würm, seems to have been established in European Russia. The Gunz was very weak and either its traces were obliterated by subsequent advances, or it was not effective in European Russia. The other three glacial advances appear to correspond in time, and in general characteristics, with those of Western Europe. Of these, the Riss glaciation had the longest duration, and the widest spread.

The fauna which accompanied the various climatic changes generally corresponds to that of Western Europe, but has on the whole a colder character. The extremely warm species are few and not abundant. Some local variations due to specific physical environment are encountered in the Crimea and the Caucasus.

Further work is needed to tie up the terraces with the ice advances more definitely. The best existing correlation is furnished by the series of loess strata with interlayers of fossil soils.

B. SKELETAL REMAINS IN EUROPEAN RUSSIA

1. Podkumok [1]

In the fall of 1918, in Piatigorsk, while excavating sewers on Bazarnaya Street, workmen came across a pottery vessel, which had been broken by spades, and a polished stone implement in the shape of a thick disc perforated in the middle. This was found at a depth of 4–6 meters. Beneath it the remains of a very brittle human skeleton were dug out and picked up by A. N. Voronin, an employee of the University of Piatigorsk.

The bones were given to M. A. Gremiatsky the next day with the details of their discovery. On the following day an attempted investigation was terminated by civil war conditions and the capitulation of the city. Therefore, the only means of dating is, on the basis of the general geological conditions of the country. V. P. Rengarten,[2] who made a subsequent geological survey, gives the following account.

The find was made on the slope of a large terrace, 15 meters above the Podkumok River. This terrace is well pronounced along the left bank of the river, and composed of boulder clay deposits. There are three terraces: (1) fifteen meters high, (2) sixty meters, and (3) one hundred and twenty meters high, the general condition for the North Caucasus, all of them of the Quaternary Age. The lower one is connected with the moraine of the last glaciation, as the deposition of the pebbles comprising its lower part was shown to be contemporary with the Würm glaciation on the basis of the process of the lowering of the snow line. The loess-like clays, which, as it is supposed, contained the remains of Podkumok man, were deposited during a short period between the beginning of the retreat of the glacier and the land raising. On the basis of this, with some corroborating evidence from the Black Sea region, Rengarten definitely dates the deposit of Podkumok as belonging to the Würm glaciation.

Gremiatsky indicates, however, a weak point in the dating due to the absence of faunal material; moreover, the find itself was not made by him, and he was forced to take the evidence of workmen as to the precise location of bones.

According to him the following human bones were found:

1. Part of a cranium, consisting of an almost whole frontal bone, the front parts of both temple bones, and a small part of the nasal bone (Pl. VII, Figs. *a*, *b*).
2. A fragment of the right side of the lower jaw with five teeth.
3. Two fragments of both temple bones.
4. A small fragment of the left part of the lower jaw.
5. A fragment of the left shoulder bone.
6. Other small fragments.

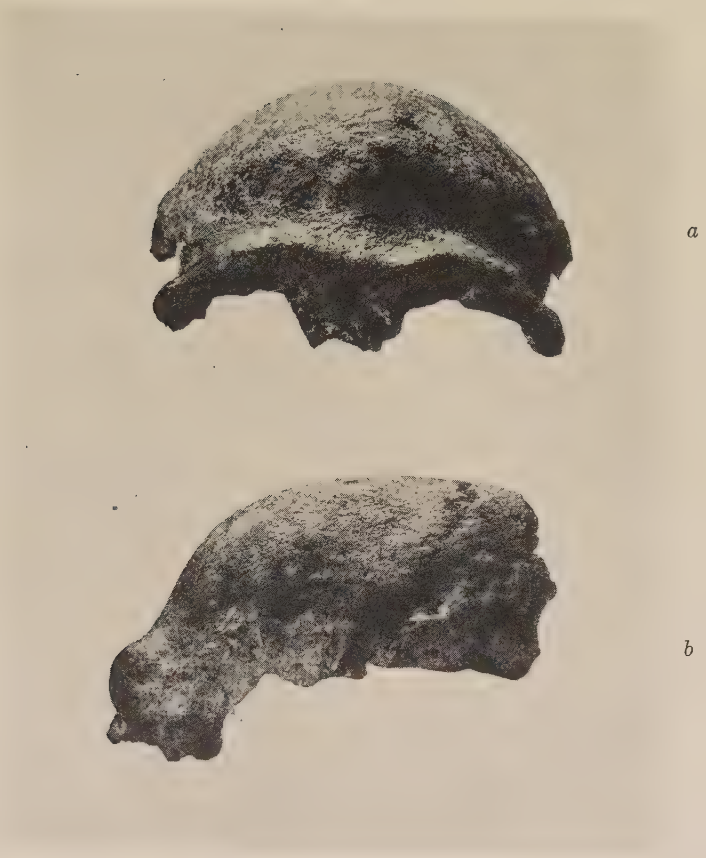
The bones in general are rather thin and small, have very weak traces of the areas of muscle attachments.

---

[1] This account represents the summary of M. A. Gremiatsky's article "The Podkumok Cranium and its Morphological Peculiarities," Russian Anthropological Journal, Vol. XII, Pt. 1–2, Moscow, 1922, pp. 92–110.

[2] Rengarten, V. P., "The Age of Deposits Containing the Remains of Podkumok Man," Russian Anthropological Journal, Vol. XII, Pt. 1–2, Moscow, 1922, pp. 193–195.

PLATE VII.



PODKUMOK SKULL. *a*, front view; *b*, side view. Photo, courtesy of Prof. Gremiatsky.

The Skull.—The small size of the skull, not too well pronounced *lineae temporalis*, and some other characteristics indicate that this skeleton belongs to a female.

The almost complete closing of the sutures and the thinness of the bones indicate that the individual died between the ages of fifty-five and sixty-five, so that this skull can be called senile, a fact which is also supported by the condition of the teeth.

After an examination of the available material, Professor Gremiatsky arrives at the following conclusions:

1. On the basis of geological evidence, the Podkumok cranium can be considered with a great degree of probability as belonging to the time of the last glaciation of North Caucasus.

2. In spite of the comparatively small size of the recovered fragment of the cranium, it is possible to establish its morphological affinity with the Neanderthal group on the basis of the following:

(*a*) The presence of uninterrupted *torus supraorbitalis* passing to *processus zygomaticus,* similar in its development to the corresponding formation of Spy II and the Krapina fragments.

(*b*) The presence, typical for anthropoids and Neanderthal groups, of the "over eye beak" (obtained by drawing the sagittal curve through the middle of the eye socket).

(*c*) The fact that the sagittal curve, drawn on the border of the inner and middle third of the eye socket, touches the medial curve in the upper glabella region.

3. By using Schwalbe's method for the special orientation of the skull, it is possible to measure the bregma angle and the frontal angle. The results obtained are: bregma angle 42–47, frontal 68–73.

4. The comparison of the Podkumok fragment with other Neanderthaloids, Anthropoids and Hominidae, permits to establish a new diagnostical characteristic for the Neanderthal man, the presence of *depressia supraorbitalis* (*fossa supraorbitalis* of Klaatch). The index of the latter is rarely over seven in the living groups and varies in the Neanderthal specimens from nine to thirteen.

	Angle of Depression	Index of Depression
Neanderthal	159	9.8
Spy II	150	12.8
Podkumok	155	9.8
Alsas, modern [1]	170	7.4
Moscow kurgan, late [1]	165	6.8
Armenian, modern [1]	162	7.8
Chimpanzee	139	16.6
Many modern skulls	180	

The angle of depression is less characteristic than the index. The importance of this method is that it permits a diagnosis on the basis of a small fragment of frontal bone.

5. The glabella index—33.6—and the considerable difference between the bregma angle and the frontal angle places the Podkumok skull somewhat nearer to modern man than other Neanderthaloids.

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[1] *Homo sapiens* with the unusual supraorbital ridges.

6. Besides the above diagnostical characteristics, the following morphological peculiarities confirm the primitive character and genetic affiliations:

- (*a*) The large interorbital space.
- (*b*) The high interorbital index.
- (*c*) The very slight development of the *Tubera frontalis*.
- (*d*) The evidently small size of the cranium.

The Lower Jaw.—Gremiatsky [1] points out that the fragments of the lower jaw have the same degree of preservation as the rest of the find. Morphologically this jaw has a number of characteristics which place it somewhere between the typical Neanderthaloids and Homo sapiens.

In his article, quoted above, Gremiatsky gives a detailed description of thè fragments, the degree of preservation, etc. Comparing this jaw with other fossil and modern jaws he points out:

- I. The features analogous to Neanderthaloids:
  - (*a*) Considerable size of *foramen maxilliare*.
  - (*b*) Presence of supra-marginal notch of considerable length.
  - (*c*) Considerable thickness of lower edge.
  - (*d*) General massiveness.
  - (*e*) Roundness of *angulus maxillae*.
  - (*f*) Considerable (reconstructed) width of the upper part.
- II. The features not found in Neanderthaloids:
  - (*a*) Suggestion of the appearance of chin protrusion.
  - (*b*) Shortness of the alveolar arc.

The Teeth.—The general length of the alveolar arc is 41.2 mm. The teeth are fairly well preserved and in their absolute dimensions do not exceed the average norm of variations for the living races. The only difference is the reduction of the number of cusps in molars, very probable in the second (4) and indisputable on the third (4).

In general, Gremiatsky considers that the lower jaw with its teeth occupies an intermediate position between that of *Homo neanderthalensis* and *Homo sapiens*.

Conclusions.—Gremiatsky feels that this new and unexpected discovery of the Neanderthaloid skeleton is very important, as it represents the first established find so far removed from the region of Western Europe. It is apparent that Neanderthal man lived in Northern Caucasus in conditions very similar to those of the diluvial period of Western Europe.

It should be pointed out that Sir Arthur Keith [2] does not accept Gremiatsky's assertion; but says that "those familiar with the diagnostic features of Neanderthal man have only to examine these illustrations [3] to be convinced that Podkumok man was altogether of the Neanthropic species."

Lately, in Russia, there has also been a tendency to question the Neanderthaloid affinities of Podkumok. The author does not feel qualified to enter into this controversy, but the data given above may help to clear the situation.

[1] Gremiatsky, M. A., "Remains of the Lower Jaw and Teeth of Podkumok Man" (Appendix to Russian Anthropological Journal, Vol. XIV, Moscow, 1925, pp. 91–99).

[2] Keith, Sir Arthur, "New Discoveries Relating to the Antiquity of Man," London, 1931, p. 365.

[3] Unfortunately the illustrations in the article of Gremiatsky are so bad, that hardly any diagnosis is possible (E. G.). The photos on Table I were furnished to the author by Prof. Gremiatsky.

2. Kiik-Koba

In the lower layer of the cave Kiik-Koba, Crimea (see details, page 240) remains of two Neanderthaloid skeletons were discovered.

3. Devis-Hvreli

Nioradze discovered a human lower jaw together with an industry of Upper Palaeolithic character in the cave Devis-Hvreli, Caucasus (see page 293).

4. Hrias'chevka

The finds of human remains in the region of the lower Volga are described by A. P. Pavlov.[1] There were four general localities from which these finds were reported.

A rich and varied fauna of the Richsdorf type (Mammoth) was found in many places on the banks of the Volga, in the northern part of the Samara and Ulianovisk (former Simbirsk) regions. The southernmost location is five miles below the village of Hrias'chevka on the left bank of the Volga, on the small peninsula of Tungus.

Here, in 1913, on the surface of the slightly colored gravel which lay under a considerable thickness of sands deposited by the river, bones of the following animals were found.

1. *Elephas primigenius*,
2. *Rhinoceros tichorhinus*,
3. *Equus caballus*,
4. *Bos primigenius*,
5. *Bos priscus* var. *latifrontis*,
6. *Alces fossilis*,
7. *Cervus elaphus*,
8. *Rangifer tarandus*,
9. *Camelus fossilis*,
10. *Carnivorae* sp.

All the bones were covered by a characteristic dark-brown patination.

A *human frontal bone* found with these bones, was somewhat lighter in color. This may indicate that it was not contemporaneous with the animal remains.[2]

5. Sobachia Prorva

The easternmost site of this group is located on the left bank of the Volga, opposite the small channel, "Sobachia Prorva." The bones of the same fauna as in Hrias'chevka were found in 1913 in the sand bar at the base of the alluvial terrace, in the layer of gravel covered by sands. The character of the gravel and bones indicate that the animal remains were found in secondary deposition. Yet, the abundance of bones, as well as the slight degree of rolling, make it apparent that their primary location was not far off. Pavlov believes that these bones were washed out from the ancient terrace, composed partly of diluvial, partly of marshy-lake formation. This terrace was underwashed by the Volga, and pieces of Jurassic concretions, Permian marls, and chalk which formed the sand bar, were deposited together with the bones.

---

[1] Pavlov, A. P., "Fossil Man Contemporaneous with Mammoth in Eastern Europe, and Fossil Men of Western Europe" (Supplement to the Russian Anthropological Journal, Vol. XIV, Pt. 1–2, Moscow, 1925, pp. 5–36).

[2] Osokov, P. A., an article in the Addition to the Minutes of the Meeting of the Moscow Society of Naturalists in 1913. Quoted by Pavlov.

The dark, almost black, polish of the bones indicates, according to Pavlov, that they were originally deposited beneath the marshy-lake formations. With these bones was found a *human humerus*, which had an almost identical patination (Pl. IX, Fig. *c*).

6. Undora I and II

The third site is situated on the island of Undora, just below the channel of "Sobachia Prorva." The animal bones were found here in a similar horizon: a layer of gravel, covered by sands. The general character of the gravel and bones is the same as in location 5. Here bones of mammoth, *Bos* sp. and *two human crania* of identical color and degree of preservation, lying side by side were found in 1913 (Pls. VIII, IX).

Parlov designates the finds of crania in site 6 as Undora I and Undora II.

Undora I (Pl. VIII, Figs. *a*, *b*).—In the cranium of Undora I only the frontal bone and the right temporal bone are preserved, thus restricting the possible number of measurements. Consequently, Pavlov made an attempt to reconstruct the whole cranium in order to obtain the position of the *inion.*

Using "the cubus Martini" to obtain the *norma lateralis* (Fig. 1, *a*) it was comparatively easy for him to establish the position of *lambda,* since the lambdoid as well as the sagittal sutures were well preserved.

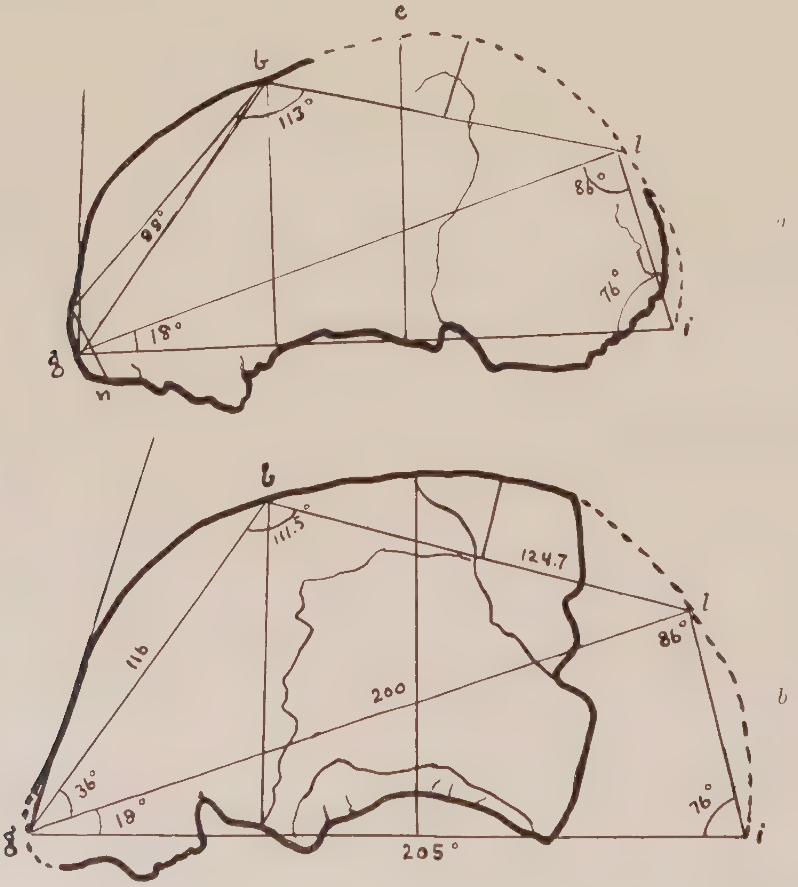
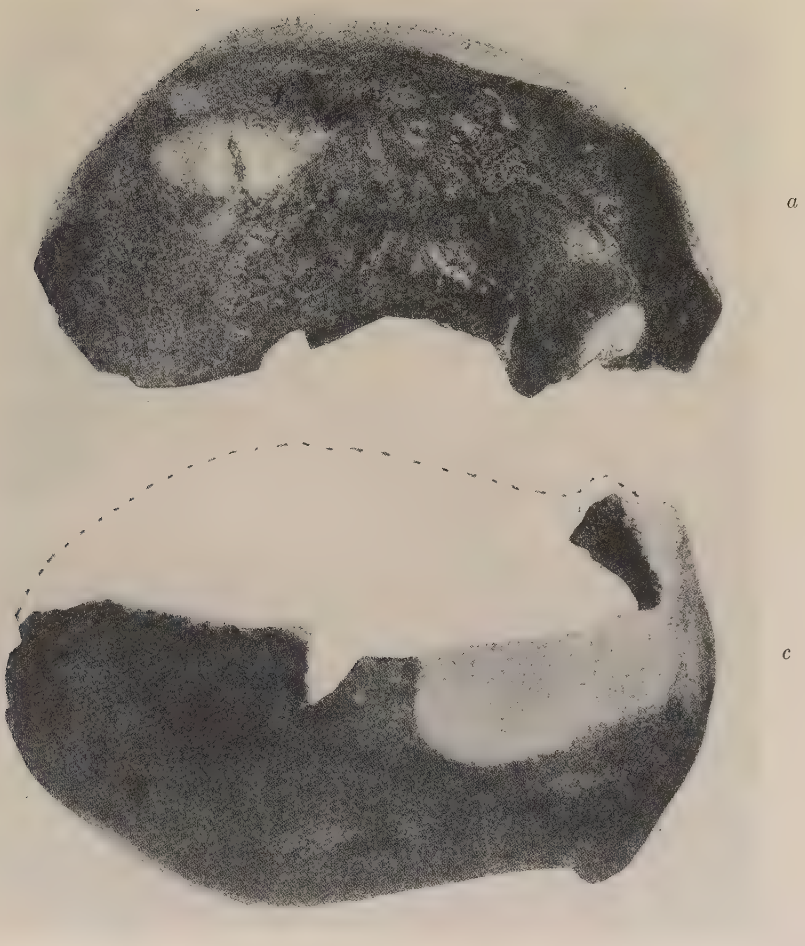


Fig. 1. *a*, Reconstruction of Undora I. *b*, Reconstruction of Undora II. After Pavlov.

PLATE VIII.



Undora I. *a*, side view; *b*, top view. After Pavlov.

To determine the *inion* he used the method of D. G. Schwalbe, with this difference: instead of allowing 20° for the angle LGI (the average for modern races), he used 18°, which is in his opinion more suitable for fossil man. He estimated then the size of the angle GLI which he considers very important, though it is somewhat neglected by anthropologists. This angle is for:

Pithecanthropus erectus	102
Homo neanderthalensis	94
South Australian	88
Homo sapiens (other)	75–84

Pavlov takes 86° as a conservative size of this angle which is one degree higher than the average for the fossil skulls (non-Neanderthal). Thus he obtained the *inion.*

Undora II (Pl. IX, Figs. *d*, *e*).—The second cranium differs markedly from Undora I. Its forehead is more sloping, the supraorbital ridges are more pronounced, and it appears to have been longer. Unfortunately a smaller part of the cranium is preserved; in the front only the left part of the orbit is preserved, so that the right side had to be reconstructed.

Since the sagittal suture does not reach *lambda*, the positions of both *lambda* and *inion* are unknown. To determine them, Pavlov used the same method as in the case of Undora I, with some modification.

TABLE IV. Comparison of Undora I and II with Other Skulls. After A. P. Pavlov.

	Undora I	Undora II	Galley-Hill	Brünn	Combe-Capelle	Canstatt	Brüx	Egisheim	Homo neanderthalensis	Pithecanthropus erectus
Maximum length	177	206	205	203	198	191	206	190	199	181
Maximum breadth	120	132	132	134	130	130	130	150	147	130
Cephalic index	67	64	69.4	66	65.7	68	63	80.2	73.9	71.8
Calvarial height	88	102	97	103	104	91	101	97	80.5	62.5
Calvarial height index	50.3	49.7	48.2	51.2	51.4	48	48	51	40.4	34
Frontal angle	80	70	82	75	84	79	80.5	89	62	54
Bregma angle	53	54	52	54	58	51	54	58	44	35
Index of position of bregma	33.7	33.6	34	33	32	33.8	33.3	32	40.5	50
Upper cranial angle	113	112	113	108.5	110	111.5	112	111.5	120	120
Glabella-lambda arc	169	200	190	196	192	184	198	181	—	173
Glabella-inion arc	175	205	201	201	191	189	204	190	199	181
Occipital angle	86	86	88	85	79	86	86	86	96	103
Lambdoid angle	76	76	74	78	82	76	77	76	65.5	64
Glabella-bregma chord	99	116	110	115	111	114	115	113	—	—
Sagitto-temporal chord	104	125	118	126	124	108	123	116	—	—
Index of frontal curvature	19	14.6	20	18.6	18	16.5	17.7	19	13.6	—
Index of frontal parietal curvature	19	19	18	19	17	12	19.5	16.3	16	—
Frontal curvature angle	138	145	135	147	139.5	142	142	138	153	137
Parietal curvature angle	136	138	138	138	136	152	130	143	145	136
Lambda-calvarial height	56	57	64	68	68	62	67	70	54.5	—
Lambda-calvarial height index	33	28.5	33.6	35.6	35.4	33.6	33.8	38.6	—	—

Taking (Fig. 1, *b*) the average length of the line B-L of the known fossil skulls as 124.7, he assumed that they are of the same size as Undora II. Then he determined the average angle GBL as 115.5, thus establishing the position of the *bregma*. The angle BGL is consequently equal to 36°, which is the average for the fossil skulls used for the comparison.

The *inion* was determined as in the case of Undora I. Though realizing the shortcomings of measurements based on reconstructions, Pavlov feels that the true values are not very far from those obtained. Then he proceeded to reconstruct the crania of Brüx, Cannstatt, and Egisheim by his method, feeling that the Schwalbe reconstruction is not accurate, and tends to make the posterior part of the skull too modern. The results of the measurements of both Undora I and II in comparison with other skulls are given in the table of measurements and indices (Table IV).

Professor Pavlov, analyzing his results, points out that both skulls Undora I and II are dolichocephalic. Undora I (67) is near Brünn (66); Undora II (64) near Galley Hill (64). The same relationship exists in the height of the cranium (hauter de la voute) Undora II (102), Brünn (103); Undora I (88), Galley Hill (97). The frontal angle of Undora I (81) is near Galley Hill (82), while Brünn is less (75) and Undora II is still less (70). The bregma angle of Undora I (53) occupies an intermediate position between the Galley Hill (52) and Brünn (54) and Undora II (54).

Comparing the two Undora skulls, Pavlov remarks that Undora I is that of a male and Undora II of a female.

Concluding, he points out that Undora I and II belong to the series of crania of the Galley Hill type, which should include Brünn and Cannstatt, appearing in Europe soon after the last glaciation.

7. GORODIS'TCHE

The fourth location is on the left bank of the Volga, opposite the village of Gorodis'tche on the island of Mulinov. Here, in 1912, likewise in a layer of gravel covered by sands, were found bones of *Elephas primigenius*, *Rhinoceros tichorhinus*, *Rangifer tarandus*, *Alces alces*, *Bison priscus* and a *human lower jaw* with a protruding chin. The bones were not so deeply colored as in the previous sites, and the fauna was somewhat different. Pavlov believes that these bones came from the diluvial deposits, and not from the marshy-lake formation.

8. SENGILEI

Professor V. A. Gorodzov[1] mentions the find of another cranium near the town of Sengilei, the date of which he questions, though, according to him, Pavlov considers it of the Galley Hill type.

9. KHVALINSK

Gorodzov also mentions the find of a part of a human cranium 25 kl. south of the town of Khvalinsk. Only the upper part with the supraorbital ridges was preserved. Both finds (Sengilei and Khvalinsk) were accompanied by the typical mammoth fauna. According to Gorodzov, Pavlov considers this skull also of the Galley Hill type. The condi-

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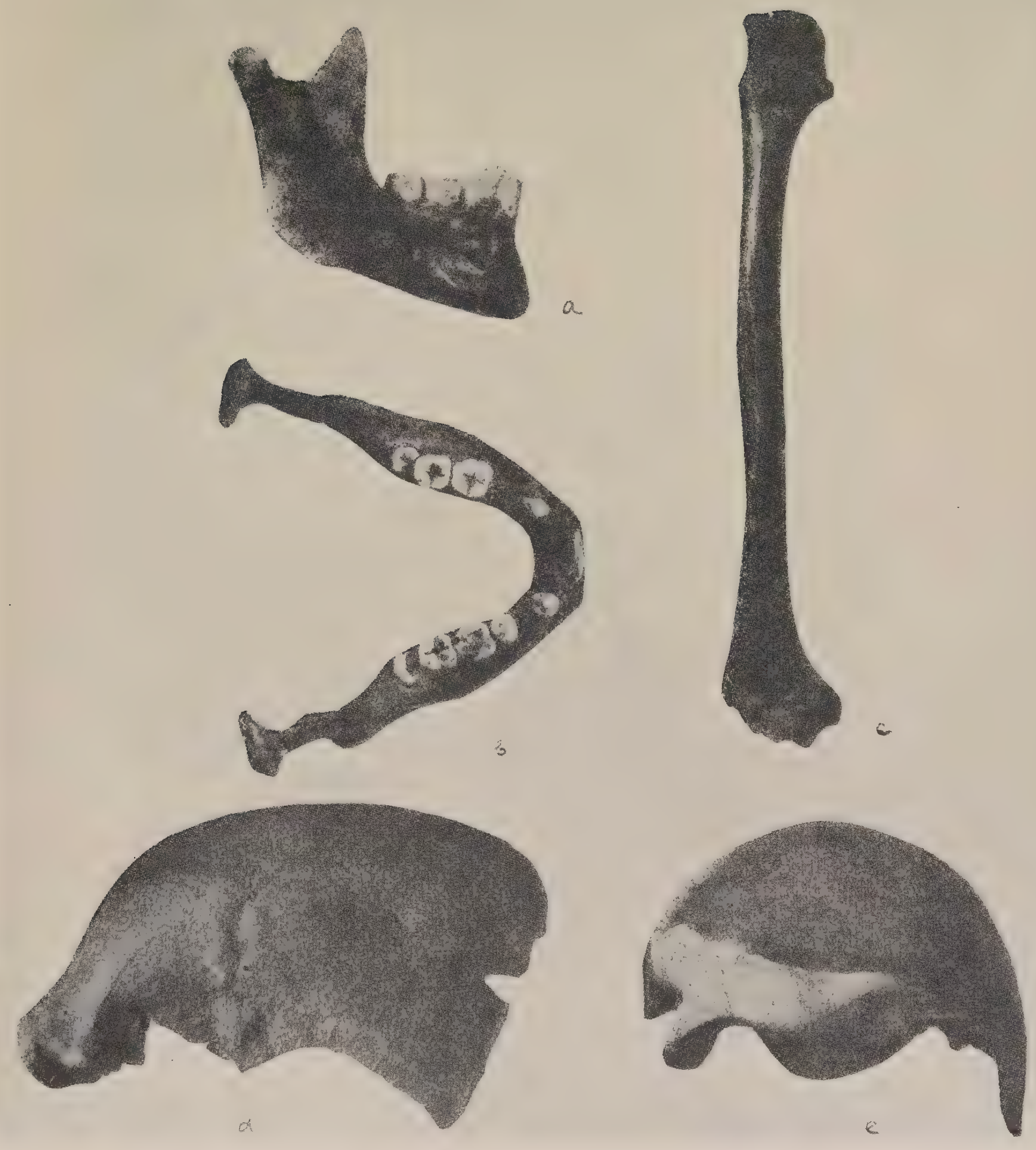
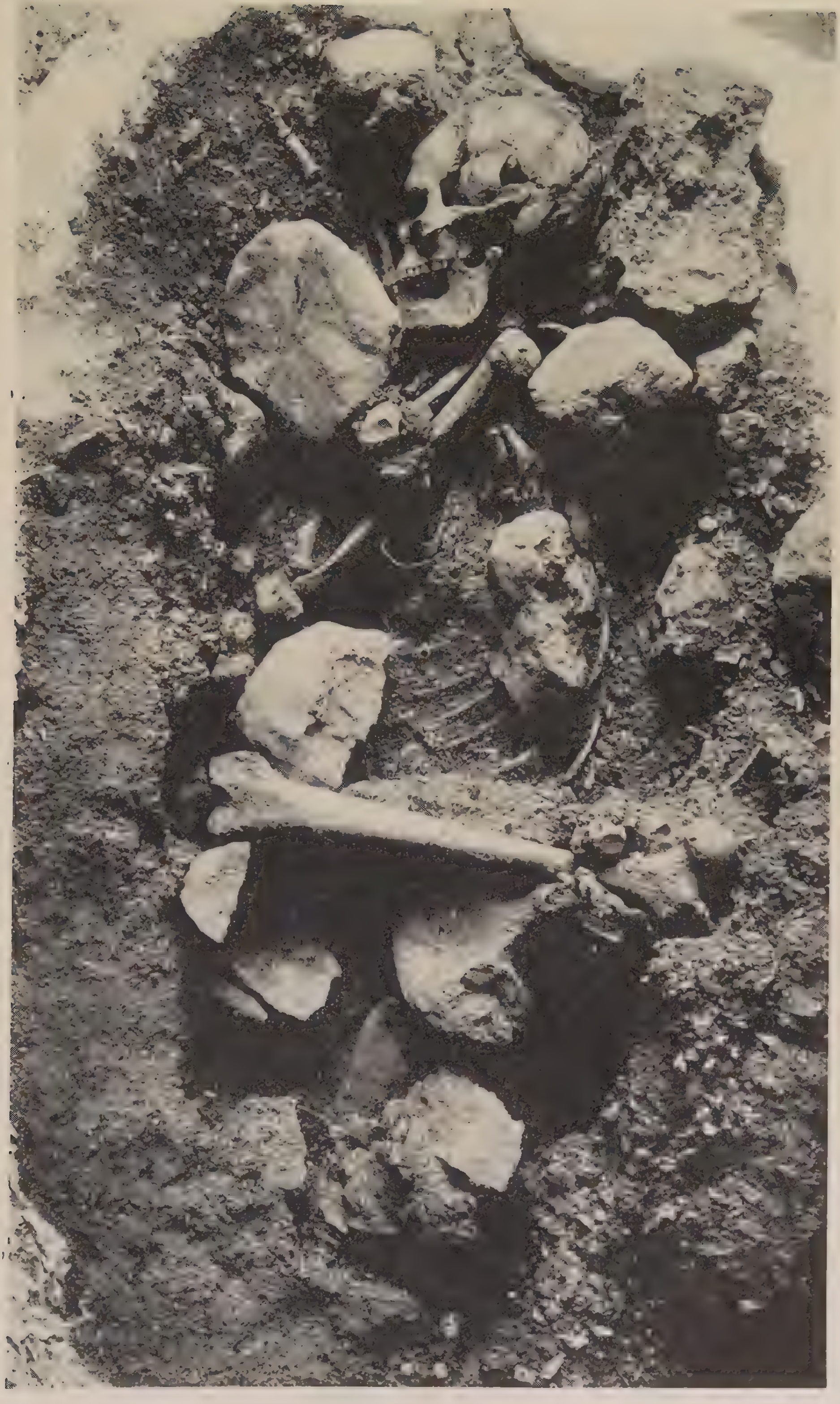
[1] Gorodzov, V. A., "The Results of Archaeological Activities in U.S.S.R. During 1918–1930." Manuscript.

PLATE IX.



a, *b*, Lower Jaw found in the Same Location as Undora I and II. *c*, Humerus found at "Sobachia Prorva." *d*, *e*, Undora II, front and side view. After Pavlov.

General View of the Rock-shelter Fatma-Koba. Photo courtesy of G. A. Bonch-Osmolovsky.



Tardenosian Burial from the Rock-shelter Fatma-Koba. Photo courtesy of G. A. Bonch-Osmolovsky.

tions of the find are described by Gorodzov in a manuscript [1] to which the author did not have access.

At the present time only the description of the Undora finds, in Pavlov's article referred to above, are available.

10. Fatma-Koba

In the Tardenoisean layer of the cave Fatma-Koba G. A. Bonch-Osmolovsky discovered a finely preserved skeleton, which was transported in block to Leningrad for study (Plates X, XI).

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[1] Gorodzov, V. A., "Investigations of Quaternary Conditions in the Region of the Lower Volga in 1929." Manuscript.

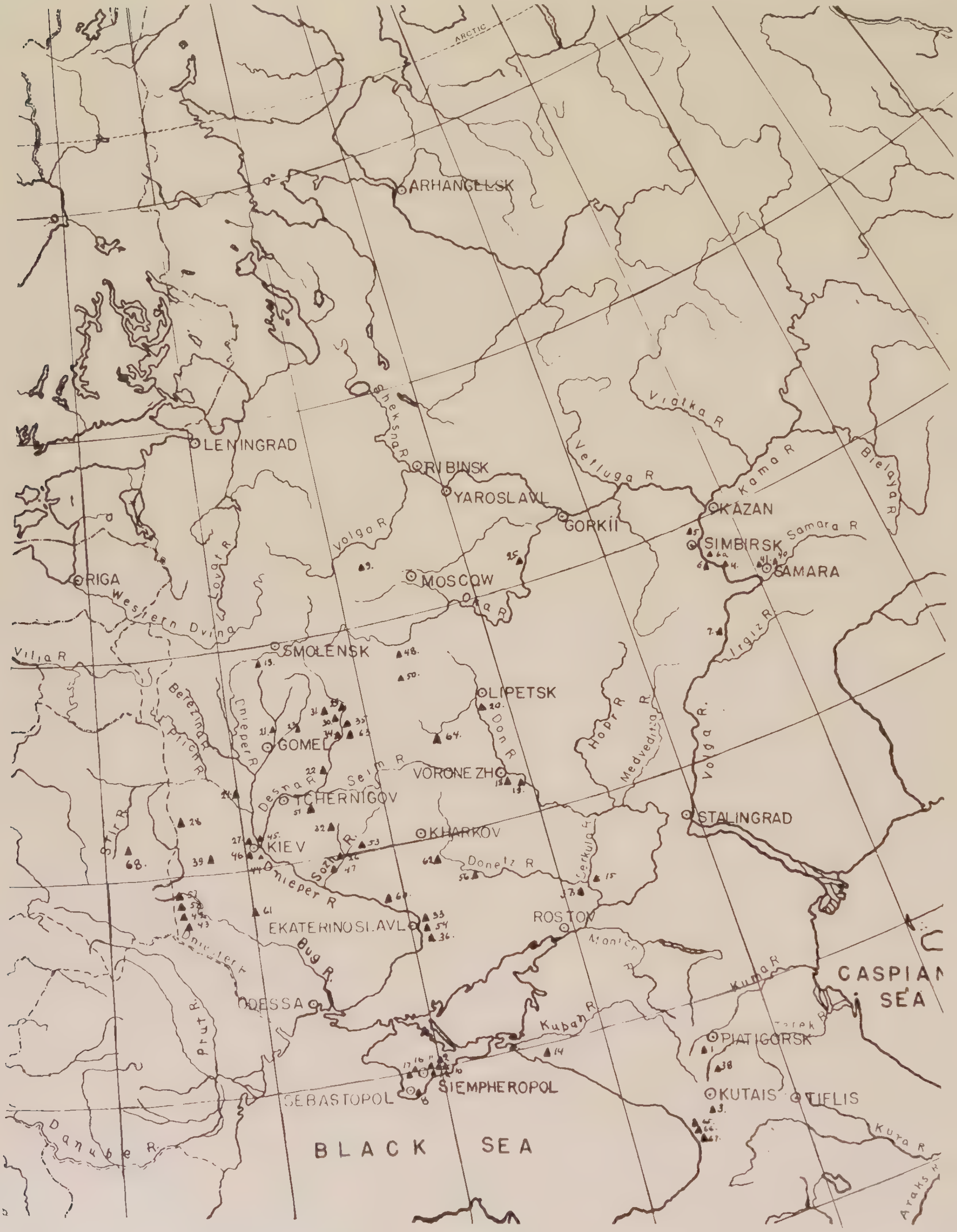
ARCTIC
ARHANGELSK
LENINGRAD
Sheksna R.
RIBINSK
YAROSLAVL
GORKII
Vetluga R.
Viatka R.
Kama R.
Bielaya R.
KAZAN
SIMBIRSK
Samara R.
SAMARA
Volga R.
MOSCOW
Oka R.
RIGA
Lovat R.
Western Dvina
Vilia R.
SMOLENSK
Berezina R.
Dnieper R.
GOMEL
Pripet R.
LIPETSK
Don R.
Hopr R.
Medveditsa R.
Irgiz R.
Volga R.
VORONEZH
Seim R.
Desna R.
TCHERNIGOV
Stir R.
KIEV
KHARKOV
Donetz R.
Chirkula R.
STALINGRAD
Dnieper R.
Dniester R.
EKATERINOSLAVL
Bug R.
ROSTOV
Manich R.
Kuma R.
CASPIAN SEA
Kuban R.
Terek R.
PIATIGORSK
ODESSA
Prut R.
SIEMPHEROPOL
SEBASTOPOL
KUTAIS
TIFLIS
Kura R.
Araks R.
Danube R.
BLACK SEA

FIG. 2. Map No. 1. Palaeolithic Sites in European Russia.

The Palaeolithic Sites on Map I

1 Podkumok,
2. Kiik-Koba and Koukrek,
3. Devis-Hvreli,
4. Hrias'chevka,
5. Undora I and II, Sobachia Prorva,
6. Sengiley, 6*a*. Gorodische,
7. Khvalinsk,
8. Fatma-Koba,
9. Rzhev,
10. Wolf Grotto,
11. Chokurcha,
12. Kosh-Koba,
13. Gamkovo,
14. Ilskaya,
15. Derkula,
16. Shaitan Koba,
17. Suren I and II and Cheken-kermen,
18. Borshevo I and II,
19. Kostenki I, II, III, IV, and V,
20. Gagarino,
21. Berdizh,
22. Mezine,
23. Novo-Bobovichi,
24. Urovichi,
25. Karacharovo,
26. Gontzi,
27. Cyrill str, Kiev,
28. Iskorost,
29. Timonovka,
30. Suponevo,
31. Elisevichi,
32. Zhuravka,
33. Dubova Gully,
34. Dovginichi,
35. Khotianovka,
36. Kastrova Gully,
37. Lugansk,
38. Gvardzhilas-Klde,
39. Kolodiazhnoye,
40. Samara, Voskresenskii Spusk,
41. Samara, Postnikov Gully,
42. Kamenetsk-Podolsk,
43. Studenitza,
44. Selis'che,
45. Kiev, Protasov Yar,
46. Kiev.
47. Viazovka,
48. Meltinova,
49. Urkusta,
50. Stenina,
51. Shapovalovka,
52. Kachinsk,
53. Sergeevka,
54. Osokorovka,
55. Kizil-Koba,
56. Schurii Rog,
57. Kolchakovichi,
58. Kosheleva,
59. Chatirzhdag,
60. Skakalka,
61. Babanka,
62. Gai and Uhnovo,
63. Degtiarevo,
64. Umrihino,
65. Virchov's cave,
66. Bartashvilli cave,
67. Uvarov's cave,
68. Novo-Alexandria.

For detailed location of Nos. 2, 3, 8, 10, 11, 12, 16, 17, 55, 59, and other Crimean sites see Map No. 2. (page 241.)

C. LOWER PALAEOLITHIC SITES OF EUROPEAN RUSSIA

1. Rzhev

Implements of Acheulean type were found by V. M. Lemeshevsky in the Rzhev district of the Tvier region. As they were for the most part surface material, the investigator could not definitely determine the original position of the find. The specimen illustrated (Fig. 3) is preserved in the Museum of Anthropology and Ethnography of the Academy of Sciences in Leningrad.

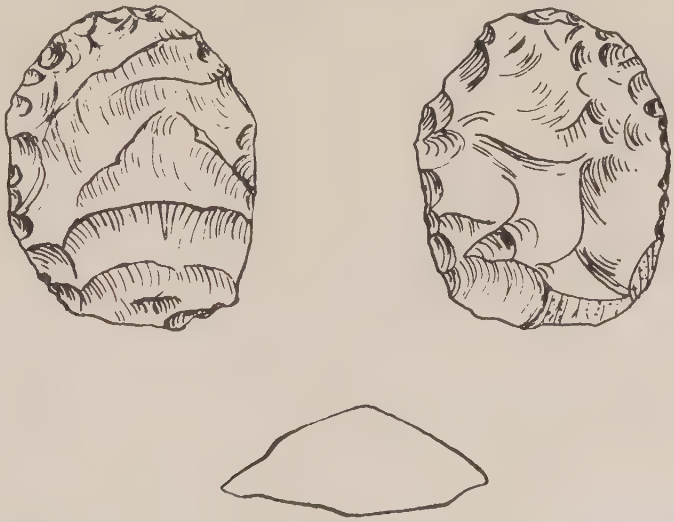

Fig. 3. Implement of Acheulean type from Rzhev district, Tvier region. 1/3 natural size. After Vishnevsky.

P. P. Ephimenko[1] considers these implements, so similar to the upper Volga and Nijni-Novgorod finds, as early Neolithic. A need for large cutting axe-like implements, created by changing natural surroundings and modes of life, changed the flint industry. The fine technical methods of the Upper Palaeolithic period could not be used in the manufacture of these tools, so Neolithic man had to use the same crude technique which was known in the Lower Palaeolithic times. This explains the reappearance of the *coup de poing*, which soon developed into a series of new forms. Further investigations will make clear the real significance of these puzzling finds which are so much like the tools of the Lower Palaeolithic period.

2. Volga Coup de Poing

This implement was found, before the World War, on the banks of the Volga in the territory of the former Samara province. At present it is in the possession of V. A. Gorodzov,[2] who is very much interested in a more accurate determination of the spot of this find which is so important for Eastern Europe. The lower Volga, where the find was made, was never under Quaternary glaciation, remaining always available for the habitation of ancient man and the contemporary fauna. By studying the rich palaeontological collections in the museums of the lower Volga towns, such as Samara, Khvalinsk and Saratov, it is easy to establish the fact that during the Lower Palaeolithic epoch, the vicinity of these towns was inhabited by such fauna as *Elephas trogonterii* and *Elasmotherium*. The bones of these animals, according to recent investigation, are found in the lower layers of the Quaternary deposits of the Volga in association with each other.

The Volga specimen of a *coup de poing* (Plate XII, *a*, *b*) weighing 300 grams is 11.6 cm. long, 8.4 cm. wide and 3.2 thick. The tool is made of bluish yellow flint. The original surface of the formation is preserved on the lower part, and the entire surface is covered by dendritice markings and patination. In form this specimen is very near the French Acheulean type (*coup de poing Acheuléen*).

3. Kiik-Koba

The site of Kiik-Koba [3] is situated at the base of the cliff overlooking the southern end of the village of Kipchak, in the valley of the Zuiya River, a tributary of the Salgir. It is 25 klm. east of Siempheropol, Crimea and 3 klm. from the village of Niezatz. (See Map No. 2, Fig. 4.)

The narrow canyon of Zuiya is about 200 meters deep. It was formed by the action of the river, cutting through the limestone formations of the plateau. The highest point there is 540 meters above sea level, 200 meters higher than the river.

In the perpendicular slope of the limestone a number of niches, corridors and rock shelters had been formed by the processes of erosion and weathering. The largest of them, Kosh-Koba, was excavated in 1920 and some traces of human industry, with a number of bones of Quaternary animals, were found.

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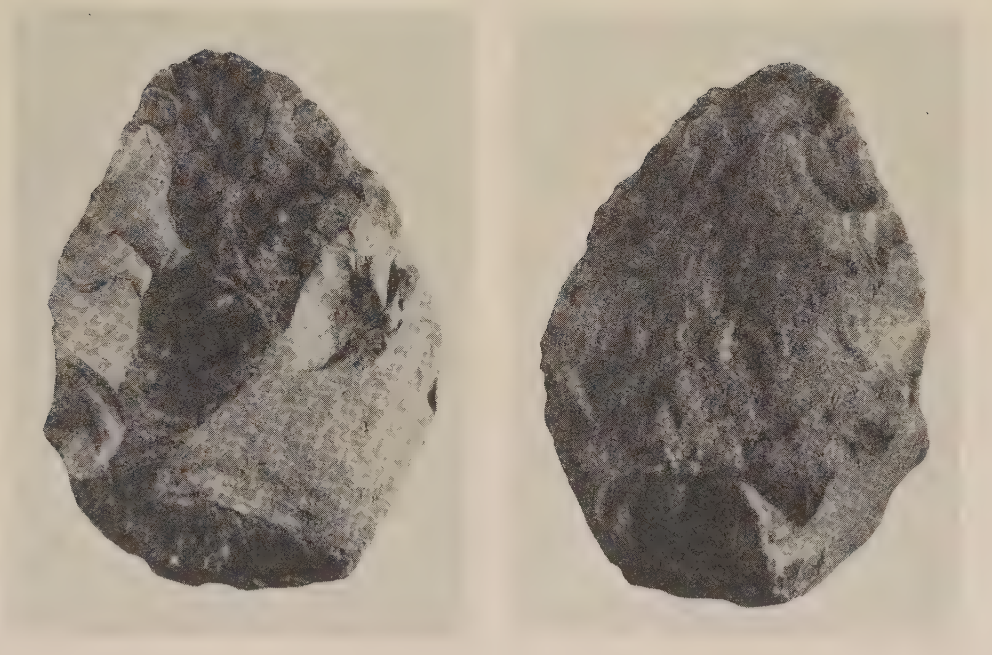
[1] According to Vishnevsky, B. N., "Prehistoric Man in Russia," Appendix to translation of Osborn's "Men of the Old Stone Age," Leningrad, 1934, p. 470.

[2] Gorodzov, V. A., "The Results of Archaeological Activities in U.S.S.R. During 1917–30." Manuscript.

[3] See preliminary account, Golomshtok, E. A., "Anthropological Activities in Soviet Russia," American Anthropologist, Vol. 35, No. 2, 1933, p. 313.

PLATE XII.



a *b*

a, b. Volga Coup de Poing. Photo courtesy V. A. Gorodzov.

The grotto, Kiik-Koba, is situated 400 meters south and some 20 meters lower than the first one. It is a rock shelter, facing southward, 16 meters wide, 9 meters long, and 7 meters high. The entrance of the grotto, well protected by overhanging rocks, is very near the edge of the steep forest-covered slope of the cliff. Just in front of it there is an enormous rock, fallen from above. The ceiling slopes sharply inward, forming a very low inside passage, and a sort of spherical niche, which reflects the rays of the sun and heats the floor which is a flat area of 100 square meters (Fig. 5).

Several hardly noticeable trails lead from the village of Kipchak to Kiik-Koba, which recently has been used as a shelter for sheep, as is seen from their excrements and the remains of the open fires of the shepherds. The position of the cave, almost on the border line of forest and steppe, with favorable sun conditions and the presence of a fresh water spring 100 meters away, made it a very suitable place for human habitat at all times.

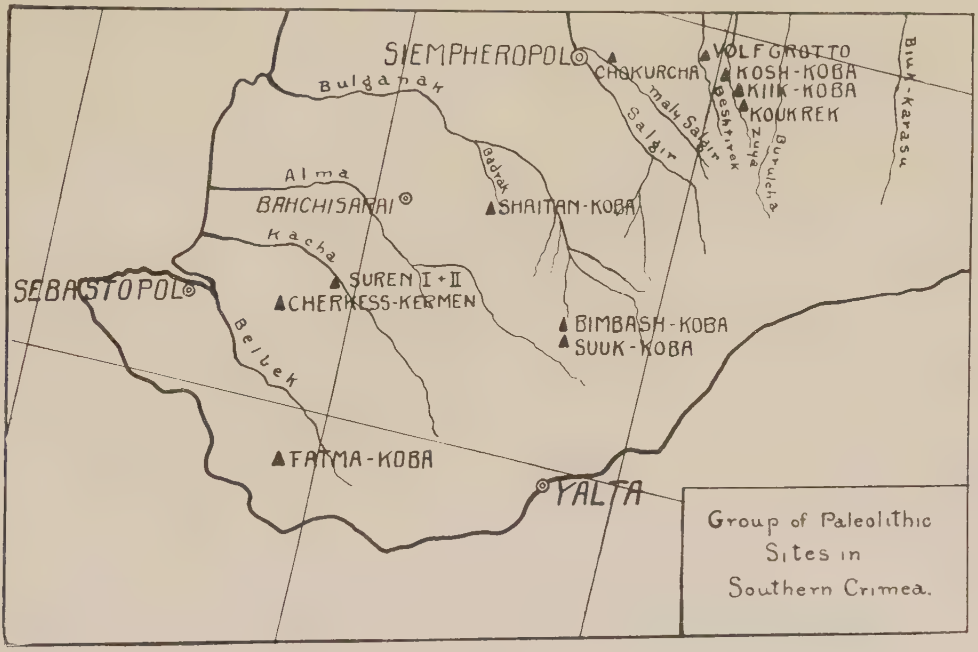

SIEMPHEROPOL
CHOKURCHA
VOLF GROTTO
KOSH-KOBA
KIIK-KOBA
KOUKREK
Biuk-Karasu
Bulganak
maly Salgir
Salgir
Beshtirek
Zuya
Burulcha
Badrak
Alma
BAHCHISARAI
SHAITAN-KOBA
Kacha
SEBASTOPOL
SUREN I + II
CHERKESS-KERMEN
Belbek
BIMBASH-KOBA
SUUK-KOBA
FATMA-KOBA
YALTA
Group of Paleolithic
Sites in
Southern Crimea.

Fig. 4.

The excavations were started in 1924 and continued in the summer of 1925. The work was done by a group of students of Leningrad University, under the leadership of G. A. Bonch-Osmolovsky[1] and Professor N. L. Ernest. In 1926 a special committee from

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[1] The material which follows represents a summary and extracts from the following works:

Bonch-Osmolovsky, G. A., "Le Paléolithique de Crimée," Bulletin of the Quaternary Committee, No. 1, 1929.

Bonch-Osmolovsky, G. A., "The Question of Evolution of Old Palaeolithic Industries," "Chelovek," 1928, No. 2–4.

Bonch-Osmolovsky, G. A., an article in the Guide for Crimea, Siemperopol, 1925.

Bonch-Osmolovsky, G. A., "The Prehistoric Cultures of Crimea," Krim, No. 2.

Bonch-Osmolovsky, G. A., an article in "Priroda," 1926, No. 5–6.

Bonch-Osmolovsky, G. A., "A Palaeolithic Site in Crimea," Russian Anthropological Journal, Vol. 14, Pt. 3–4, Moscow, 1926, pp. 81–87.

Glavnauka,[1] consisting of Professors Bunak, Gorodzov, and Zhukov, visited the site, and confirmed the conclusions of the excavators. At present the material is in Leningrad, forming part of the exhibition of the Quaternary Committee of the U.S.S.R. Academy of Sciences.

The stratigraphy of the site, as revealed by the excavations, is as follows (Plate XIII, *a*):

I. The contemporary black layer.
II. The gray compact layer.
III. Quaternary clay.
IV. The upper hearth layer.
V. The intermediate yellow layer.
VI. The lower hearth layer.
VII. The rock bottom of the cave.

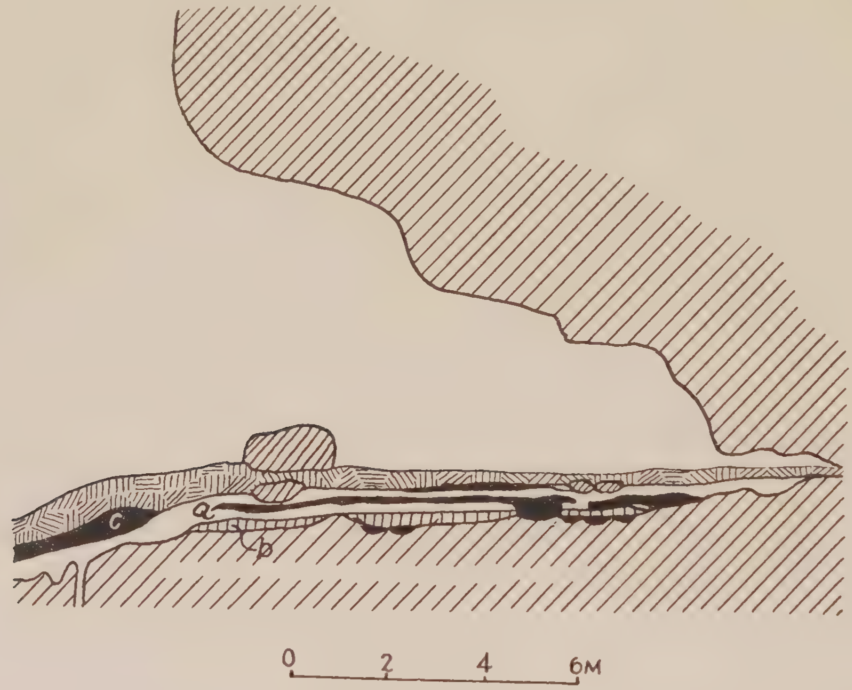

FIG. 5. Section of the Cave Kiik-Koba. *a*, upper layer; *b*, lower layer; *c*, Tardenosian level. After Ephimenko, "Pre-Clan Society."

On the top was (I) a contemporary black layer of ashes and sheep dung with pottery of different epochs, ranging from the Bronze to the Tartar age. This layer is 25 cm. thick and poor in finds, and does not give sufficient basis for further subdivisions.

Under it, separated in places by (II) a thin gray layer, was (III) a loose yellow clay containing stony debris, and (IV and VI) two fire-place layers. The lower one lay immediately on VII, the even floor of the cave.

A careful examination of the floor showed that the weathered limestone formed, in spots, "carst" depressions, which were filled by absolutely dry, pale-green clay, schistous in structure.

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[1] The highest official scientific body of U.S.S.R.

Bonch-Osmolovsky gives the following reconstruction of the history of this Grotto: The low entrance indicates that the beginning of the formation of the cave was started by the small spring which found an outlet in the more permeable layers of limestone. The water action washed out "carst" depressions in the rocky bottom of the cave, and, during the period preceding the disappearance of the spring, it filled the depressions with clay brought from the depths of the formation, and thus evened the floor of the cave.

The spring disappeared long ago, previous to the formation of the layers covering the floor of the cave and before weathering became the main factor.[1]

The location of Kiik-Koba, in the very corner of the formation, made it especially open to wind action and weathering processes. The pieces of limestone fell down from the ceiling and disintegrated into loose debris of a brilliant yellow color.

Two later periods of man's occupation of the cave are indicated by the remains of open fires and deposits of organic matter, which colored the ground gray or black, depending on the thickness and duration of occupation. Thus two hearths were formed (layers IV and VI).

They are divided by a well-pronounced yellow layer (V), containing a small quantity of flint and bones. This shows that the periods of occupation were separated by certain intervals. The thickness of the intermediate layer, averaging 15 cm., testifies to the considerable time between the two periods of occupation, which is confirmed by an analysis of the contents of both cultural layers.

The gray compact layer (II) is the upper part of the Quaternary clay (III), with many streaks of later open fires. Finally, the contemporary black layer (I) is really of the same origin as the hearth spots of the Quaternary epoch. Due to the faster accumulation of ashes, and organic remains from the flocks which spend the nights here, it is of a darker color and more loosely formed.

All layers of Kiik-Koba are very thin, considering their antiquity; near the wall they are about 50 cm., increasing toward the entrance to 150 cm. This can be explained by the strong winds blowing off the loose debris, and the character of the canyon's slope in Pleistocene times.

The section cut in 1925 gives reason to suppose that, in the beginning of the formation of the cave's layers, the slope was not covered by humus, and was steep and rocky. Only later the process of accumulation of debris reached the level of the cave. Naturally, a considerable part of the deposits fell down the slope. The excavation of the slope may add, therefore, to the finds of Kiik-Koba.

The contents of both cultural layers differ sharply from one another. The lower hearth layer, 10–20 cm. thick, occupies almost the whole floor, except the innermost southern part of the cave, where elevations of the floor are noticeable. There it is absent, and the intermediate or upper hearth layer lies directly on the rocky floor. (Fig. 5.)

The lower (VI) layer is distinguishable almost always by its dark, almost black color. In it were found a large quantity of flint tools and chips, and a very few animal bones, the latter being in a very poor state of preservation. They are completely devoid of organic matter, though not mineralized, and at the least touch they crumble and require lacquer treatment. Many bones show evidence of fire action. The whole deposit was lying on the rocky surface of the cave. Preliminary examinations of bones found there, made by A. A. Bilianitsky-Birulia, Director of the Zoological Museum of U.S.S.R. Academy of Sciences, showed the following:

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[1] Malycheff, Vera ("Le Loess," Revue de Géographie physique, 1929–30, Vol. II, III) considers that the layers of Kiik-Koba may be contemporaneous to the recent loess.

Equus caballus,
Equus hemionus,
**Sus scrofa,*[1]
Bison (*priscus*),
Cervus elaphus,
Cervus megaceros,
Saiga tatarica,
**Canis lupus,*
**Vulpes vulpes,*
**Lepus timidus,*
**Citellus rufescens.*

An entirely different picture presents itself in the upper (IV) cultural layer. Both in area and thickness it is less than the lower one, but the quantity of bones exceeds the lower one ten times in weight. The bones are broken, the long bones split lengthwise for extracting marrow; many are charred. The following bones were found:

Elephas primigenius,
Rhinoceros tichorhinus,
**Equus caballus,*
**Equus hemionus,*
Equus asinus,
Sus scrofa ferus,
**Bos* sp.,
**Cervus elaphus,*
**Cervus megaceros,*
**Saiga tatarica,*
Canis aureus,
Canis lupus,
Vulpes vulpes,
Vulpes corsac,
**Ursus spelaeus,*
Hyaena spelaea,
**Lepus timidus,*
**Marmota bobac,*
**Citellus rufescens,*
**Cricetus cricetus.*

This fauna, though undoubtedly indicating the Quaternary age of the hearth layers, still does not give sufficient basis for more specific indications of the time period, because of the lack of knowledge of the succession of faunal stages in Crimea. Being of a mixed forest and steppe type, it indicates a landscape somewhat similar to that of present times. It should be noted that Kiik-Koba is only 2 klm. from the present southern limit of the forest hill and steppe area.

On the basis of the above lists, it is hard to arrive at any opinion as to differences in both faunae, as all species of the lower (VI) are found also in the upper layer (IV) and the variety of the latter is perhaps due to the quantity of bones found. It is also possible that the marked increase of species may be related to the degree of perfection attained in the flint industry of the second (IV) layer, as compared with the cruder tools of the lower. At any rate, the fauna does not give any basis for the reconstruction of the climate. Some light is shed on this subject by the examination and analysis of the charcoal, which was made by the Institute of Technological Archaeology of the Academy of the History of Material Culture.

This study of charcoal and ashes by Palibin and Hammermann [2] resulted in the identification of the following flora (in both horizons): (Fig. 6).

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[1] Those marked with asterisks are added from Gromov, V. I., "The Geology and Fauna of the Palaeolithic of U.S.S.R.," Problems of the History of Material Culture, Parts 1–2, 1933, pp. 22–33.

[2] Palibin, J., and Hammermann, A., "Kohlenreste aus dem Palaolithikum der Krim, Hohle Kiik-Koba," Bulletin of the Quaternary Committee, No. 1, 1929, pp. 35–37.

1. *Acer* (?). 2. *Rhamnus cathartica.* 3. *Juniperus* sp.

Industry.—The flint implements of the upper and lower layers differ sharply in quantity, color, technique, and patination.

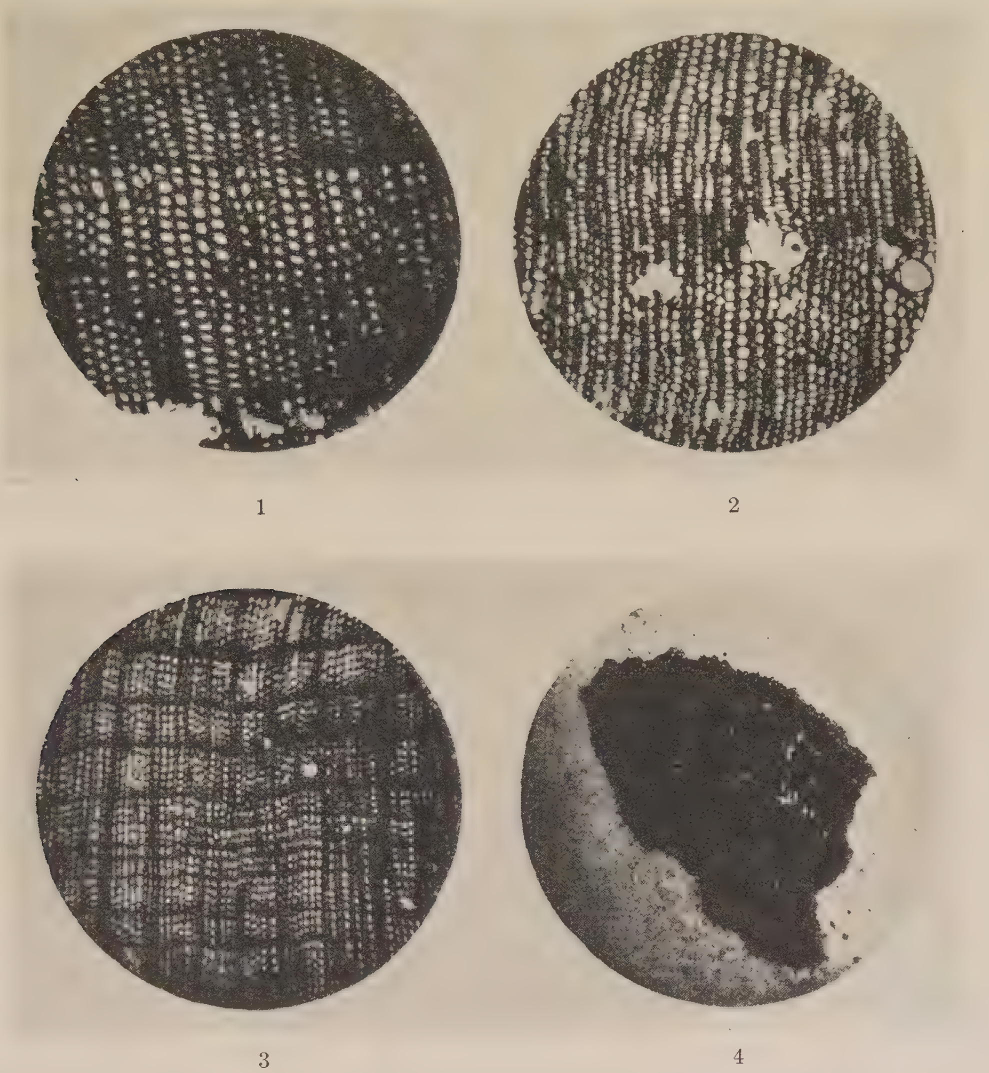

FIG. 6. Microscopic Analysis of Ashes from Kiik-Koba. After Palibin and Hammermann.

1. Querschnitt des rezenten Kiefernholzes.
2. Querschliff der Kohle aus demselben Kiefernholzstück.
3. Querschliff von Juniperus sp. Kohle aus Kiik-Koba.
4. Querschliff von Rhamnus cathartica Kohle aus Kiik-Koba.

Lower Layer (Figs. 7, 9, 10).—In the lower layer were found over 10,000 flint tools and chips. Almost all are of a dark color, covered by gray spots of patination. The technique of manufacture was very primitive: there is an absence of established forms; the retouch which improves the working edges is rough, as if the unskilled master could not make the desired forms, but followed the accidental outlines of roughly made flakes, only slightly improving them on the edges. The chips found are, in the majority of cases, rejects, due to the unskilled flaking of the nucleus.

According to the excavator, the general impression of the culture of the lower layer leads one to the conclusion that it was the first attempt to master the technique, when in the preparation of each tool, time, work, and material were wasted. Perhaps this imperfection of hunting tools can explain the limited number of animal bones found in this layer.

The typical industrial forms are absent in the lower layer. One can distinguish a certain number of small *coups de poing*, notched scrapers, and rather formless points—perforators. Bonch-Osmolovsky refers to this industry as "atypical."

Upper Layer (Figs. 8, 10, 11, 12, 13).—In the upper (IV) layer the flints are found in much lesser quantity. Altogether 500 tools and some 4000 flakes were found there. They are light brown in color, semi-transparent, with less patination, and differ markedly from the flints of the lower layer. Many well made tools of a definite form, finely retouched, and showing good workmanship, were found. About sixty per cent of them are triangular points up to 7 cm. long, made on a more or less flat flake with one sharp corner, retouched on both sides, of La Micoque type. There are also smaller points, triangular in shape, worked on one side only. About twenty per cent of the implements were scrapers, retouched on one side.

The absence of other forms indicates the universality of the use of the point; it was used for many purposes for which, in upper Palaeolithic times, man developed many different tools. According to the excavator, points were used for cutting, drilling, perforating, and scraping. It is possible that at the same time it served as a point for striking and throwing tools.

The small number of forms represented in this layer, as well as the technique of their making, place this culture in the Middle Palaeolithic or Mousterian. Among the points and scrapers of Kiik-Koba, we find many which are worked on both sides having been made on a core and not on a flake. This links the upper layer with the culture of La Micoque, widely distributed throughout Central Europe and Poland, and which belongs to the end of the Acheulean or the beginning of the Mousterian period.[1]

On the basis of the dating of the upper layer, Bonch-Osmolovsky dates the lower as Lower Palaeolithic, which is confirmed by the primitive character of its technique.

In his opinion, the atypical character of the tools and the rudeness of technique links it with the industries of the lower layers of La Micoque, Le Moustier, Hudenus and perhaps Crapina, Taubach, Ehringsdorf and Wildkirchli, and which are best characterized by the word "amorphic."[2]

Bonch-Osmolovsky illustrates without further discussion the implements from the VI and IV layers reproduced on Figs. 7, 8.

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[1] See Cave Okenik in Poland, the site of Golonskaya in Poland, in Kozlowsky, "The Old Stone Age in Poland," Poznan, 1922. It is possible that two artifacts found by Merezhkovsky in the Bieshtirietsk Cave in Crimea belong to the same culture (E. G.).

[2] According to the latest classification of M. L'Abbé Breuil, La Micoque is Acheulian VII. ("Etudes de stratigraphie paléolithique dans le nord de la France, la Belgique et l'Angleterre," L'Anthropologie, Vol. XLI, 1931.)

Fig. 7. (Natural Size.) Lower layer VI.

1. Side scraper.
2. Side scraper (?).
3. Side scraper.
4. Side scraper with point.
5. Point perforator (?) formed by two notches.
6. Convex side scraper.
7. Small biface.
8. Nucleiform tool (?).
9. Triangular blade with partial retouch on right edge and traces of retouch (?) on the lower face.

Fig. 8. (Natural Size.) Upper layer IV.

1. Triangular side scraper on thin flake.
2. Triangular point on flake with fine retouch along the edges.
3. Small biface.
4. Finely retouched biface with round base.
5. Triangular point on flake, retouched along the edges.
6. Small biface.
7. Small biface.

The following implements are illustrated here from the drawings made by H. Breuil from original material from Kiik-Koba exhibited in Paris by Bonch-Osmolovsky:

Lower Horizon or Layer VI.

Fig. 9.

1. Round scraper with lower face partly retouched.
2. Pointed tool with retouched notch.
3. End scraper with partial peripheral retouch.
4. Small bifacial tool.
5. Small bifacial tool (?).
6. Irregular flake retouched along the edges.
7. Crude point with secondary retouch along the left edge.
8. Small bifacial tool.
9. Small bifacial tool.
10. Small *coup de poing* with secondary retouch.
11. Fragment of tanged point (?).
12. Scraper.
13. Side scraper.

Fig. 10.

1–3. Irregular pointed flakes with secondary retouch.
4. Triangular flake with partial bifacial retouch.
5. Scraper (?).
6. Notched flake with secondary retouch.
7. Side scraper.
9. Very small point.
10. Very small scraper.
11. Very small scraper.
12. Oval scrapers with peripheral retouch.
13. End scraper on blade (?).
17. End scraper, retouched along all edges.

Layer V.

Fig. 10.

8. Small scraper with some retouch on the lower face.
14. Side scraper.
15. Round scraper.
16. Scraper of type *carenée atypique.*

Layer IV or Upper Layer.

Fig. 11.

1. Rectangular biface.
2. Triangular point with fine peripheral retouch.
3 4. Small bifaces.
5. Long flake finely retouched along the right edge.
6. Finely retouched triangular biface with flaked base.
7. Small *coup de poing* of La Micoque type.
8. Finely retouched point.
9. Point on a thin flake.

Fig. 12.

1, 2, 4, 7, 8, 12, 14. Small bifaces with more or less pronounced points.
3, 5, 6, 9, 10, 11, 13. Points approaching classical Mousterian type.

Fig. 13.

1, 2, 3. Side scrapers.
4. Irregular tool retouched all along the edges.
5, 6, 7, 8. Points.
9. Round scraper with partial retouch on the lower face.
10, 13, 15. Points.
11, 12, 16. Small pointed bifaces.
14. Point on a narrow small blade.

Layer III.

Fig. 13.

17. Perforator (?) on a thin flake retouched on both faces. The fine retouch on the edges and lower face makes a sharp point.
18. Implement of Upper Palaeolithic type made on a long narrow flake with retouch along the right edge, forming a point of Chatelperron type.

The Human Remains. In the lower hearth layer of the Kiik-Koba cave were found two incomplete human skeletons; an adult and a child. The bones of the adult lay in a grave which, undoubtedly, had been intentionally dug in the rocky floor of the cave.'' The grave was rectangular in shape, 170 cm. long, 55 cm. wide, and up to 30 cm. deep. In the middle was a small depression for the pelvis, and, at the eastern end, one for the head.

The grave was situated almost in the center of the cave and orientated east-west. In the western end, in normal position, were the right tibia and bones of both feet (Plate XIV). Over these bones the lower hearth layer was 7 cm. thick, being separated here from the upper layer by a yellow intermediate layer.

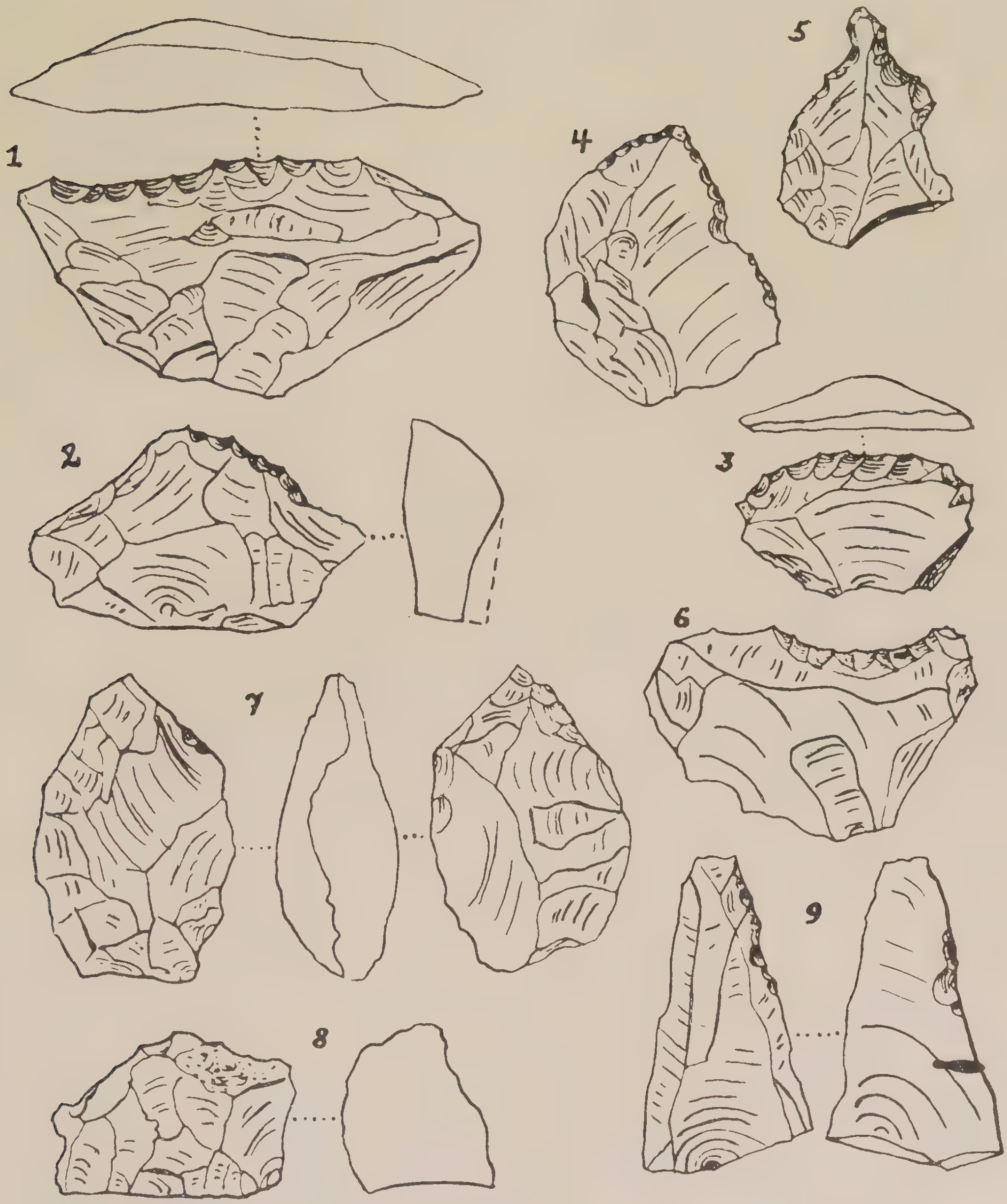

FIG. 7. The Flint Industry of Kiik-Koba, Lower Layer (VI). After Bonch-Osmolovsky.

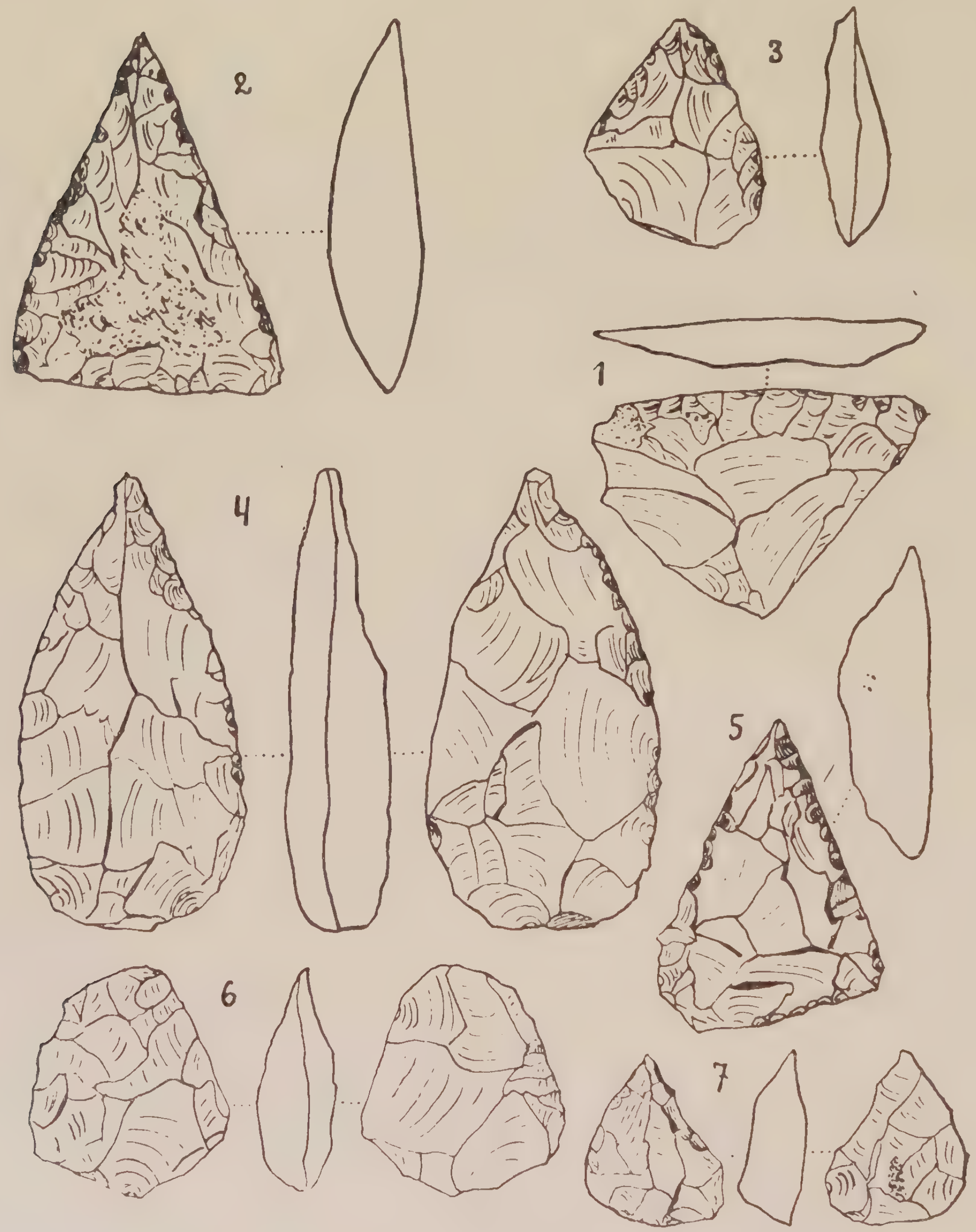

FIG. 8. The Flint Industry of Kiik-Koba, Upper Layer (IV). La Micoque. After Bonch-Osmolovsky.

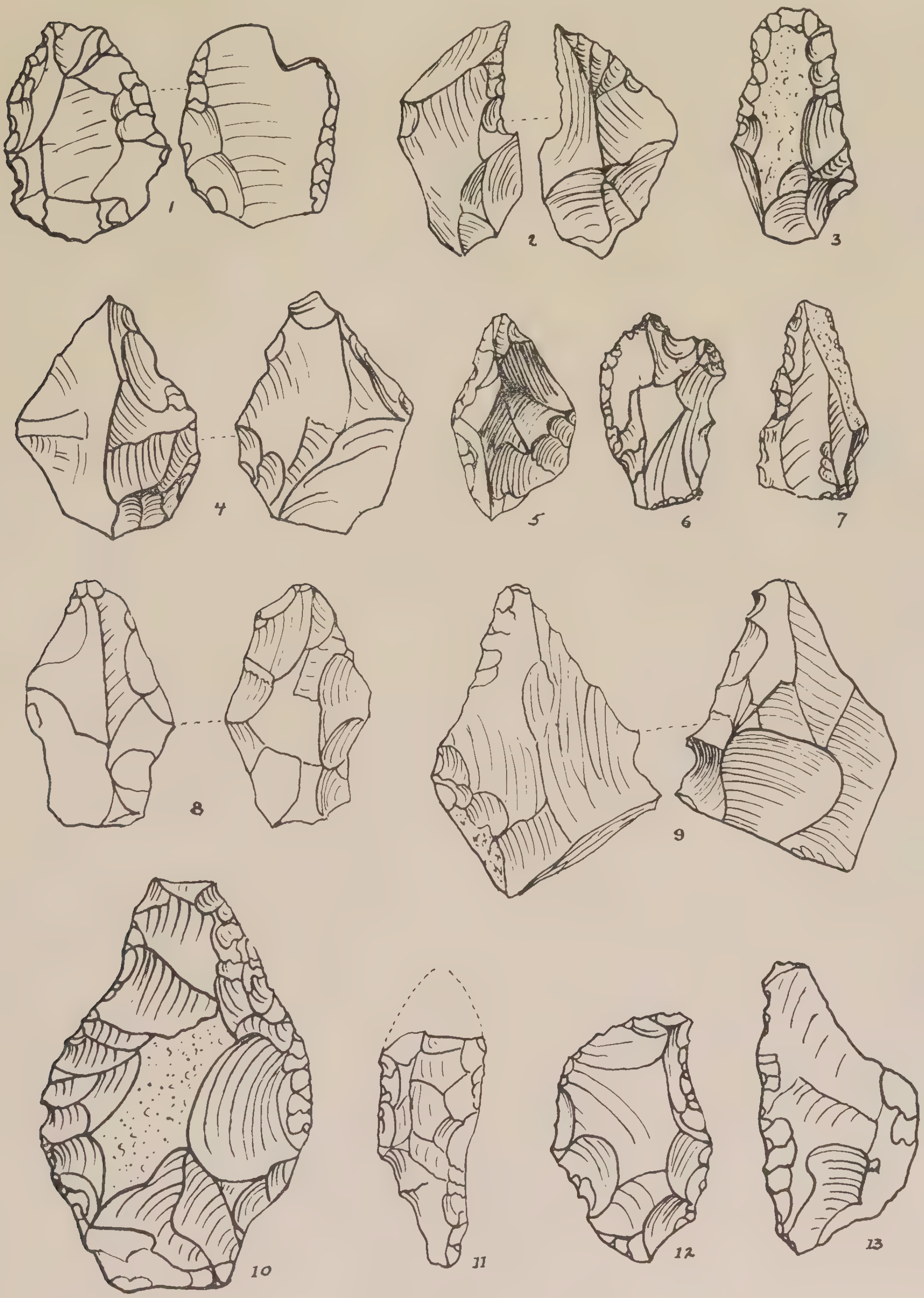
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Fig. 9. Lower Layer (VI) of Kiik-Koba. After H. Breuil.

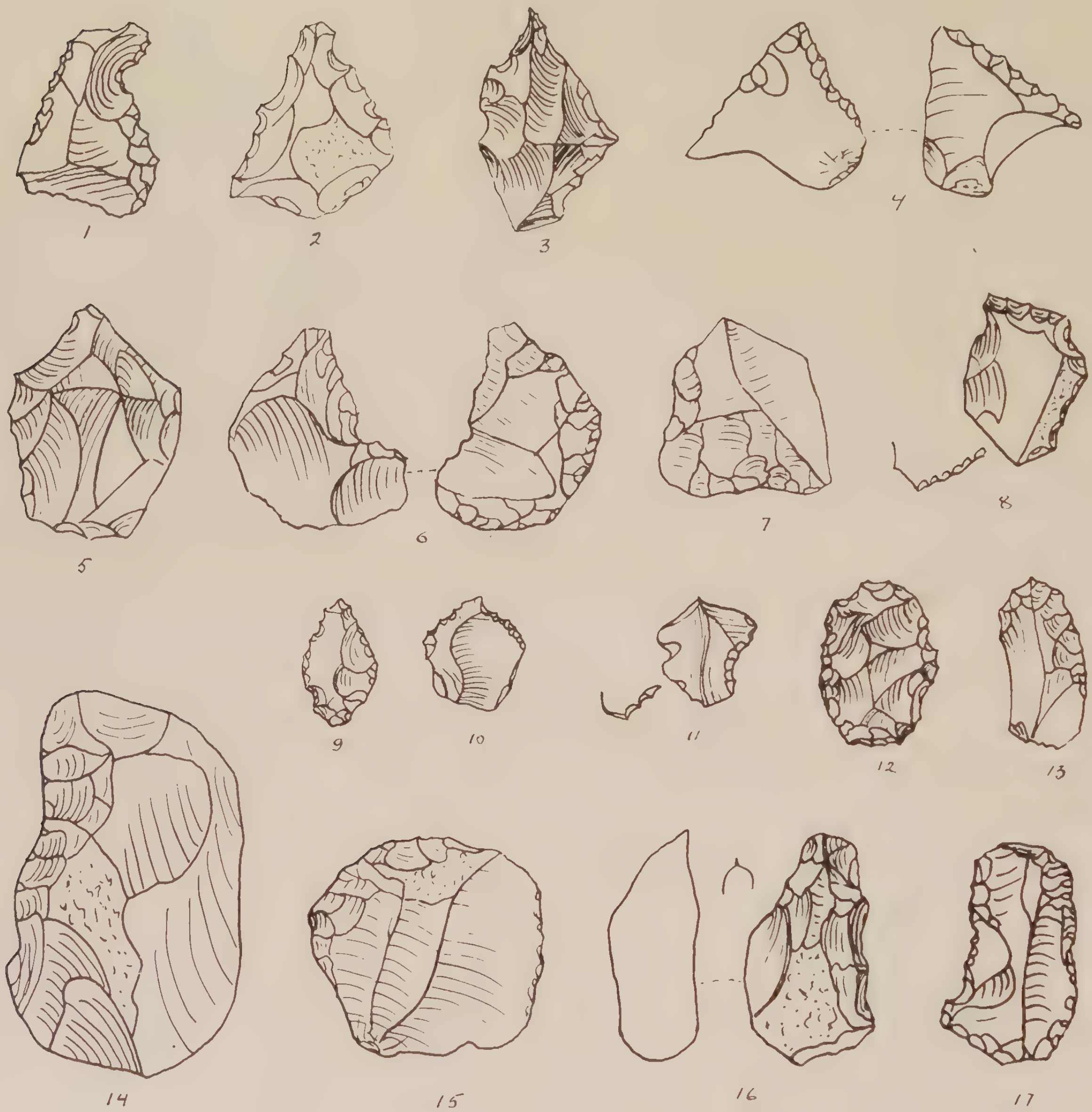
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Fig. 10. Lower Layer of Kiik-Koba (VI), Nos. 1–7, 9–13. Next Layer of Kiik-Koba (V), Nos. 8, 14–17. After H. Breuil.

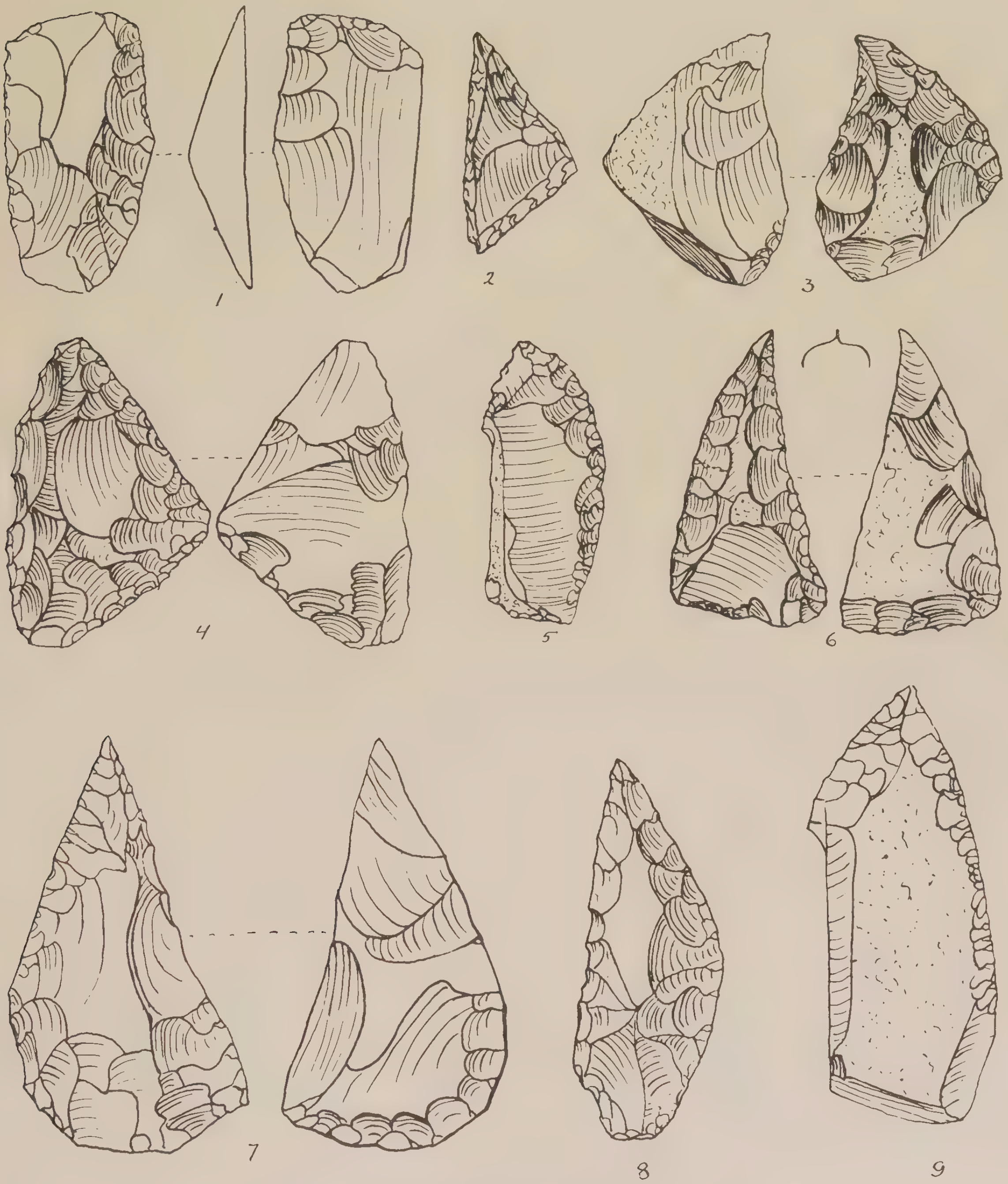

Fig. 11. Upper Layer of Kiik-Koba (IV). After H. Breuil.

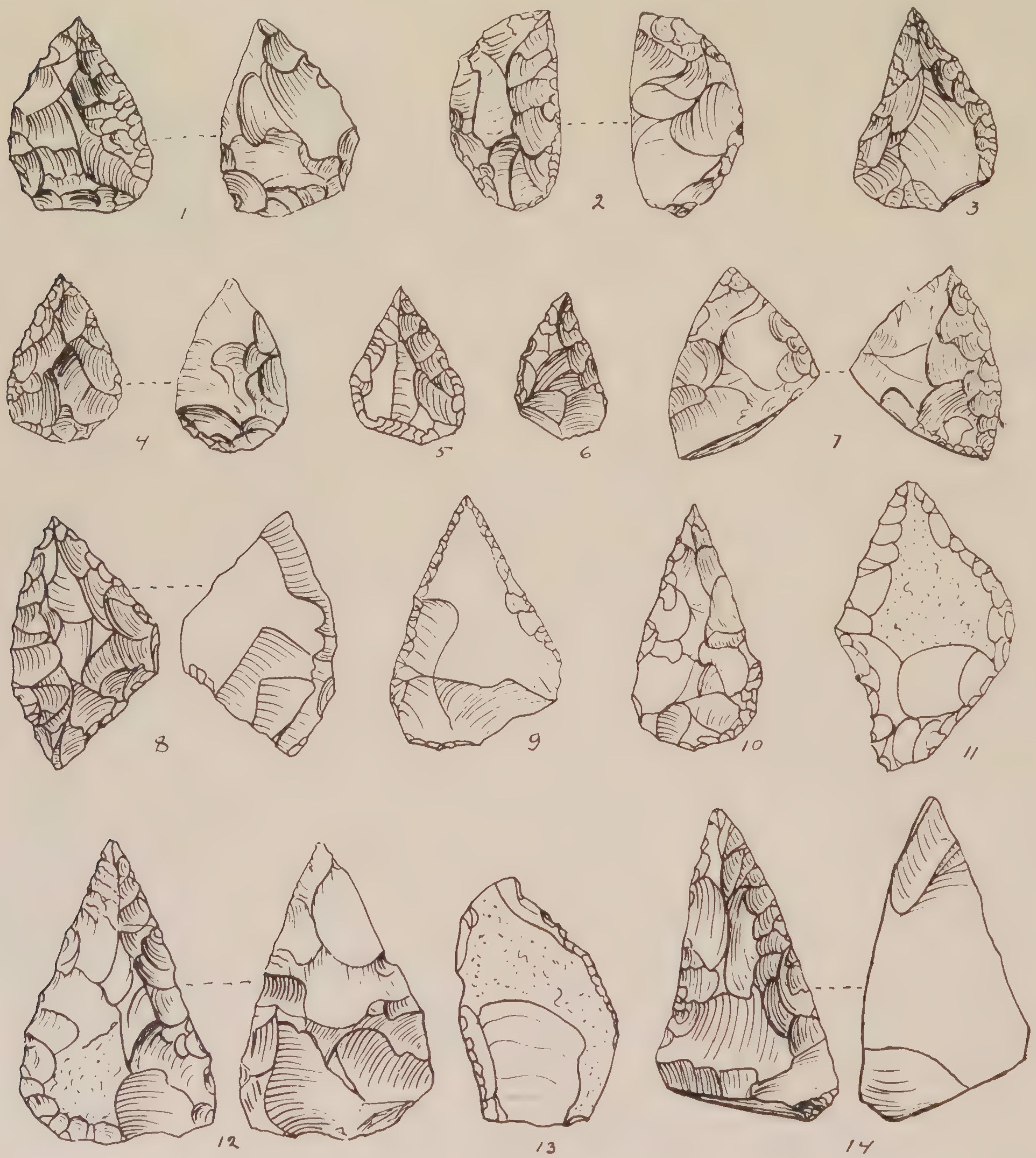
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Fig. 12. Upper Layer of Kiik-Koba (IV). After H. Breuil.

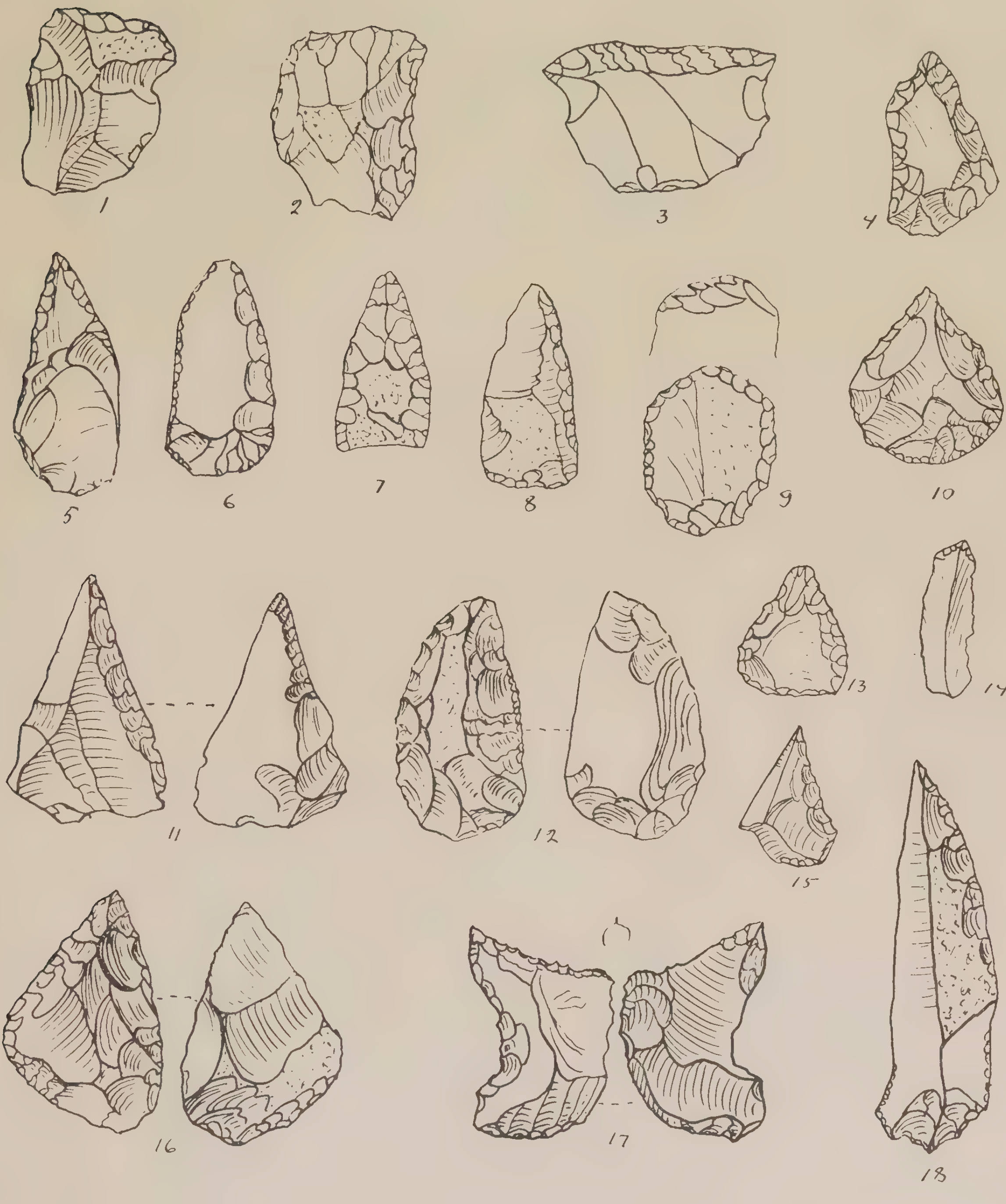
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FIG. 13. Upper (IV) Layer of Kiik-Koba, Nos. 1–16. Third Layer (from the Top) of Kiik-Koba, Nos. 17–18. After H. Breuil.

The buried body evidently had been laid on the right side with the knees slightly flexed. In the middle and the eastern part of the grave no bones were found except of a few phalanges of the hand. In this place the upper (IV) hearth layer, characterized by many animal bones, gray flint and well made artifacts, extended down to the grave. Near the bones of the feet, and among them, were found a large quantity of flint chips typical of the lower (VI) hearth layer.

The human bones were as fossilized as the animal bones. Excavating them took two days, because of their extraordinary fragility. Before they could be taken out, it was necessary to saturate them twice with a solution of shellac in alcohol. Otherwise they turned into powder at the slightest touch.

Doubtless, this burial is contemporary with the lower hearth layer; very likely it was partly destroyed by the men of the upper hearth layer, who dug a small pit here. Evidently, the rest of the skeleton was thrown down the cliff, for in 1925 several human bones were found near the base. Perhaps, a careful search may result in the recovery of other missing parts of the skeleton.

At a distance of about 1 meter north of the grave, on the rocky bed of the cave, was found the skeleton of a one-year old child. It lay on the left side in a flexed position, with the left hand under the knee. Here the IV layer was directly over the VI (the intermediate layer being absent), but, on the basis of the character of the flint chips, it could be supposed that this skeleton also is contemporary with the lower hearth layer.

The following bones of an adult were found in 1924:

1. One of the front teeth with a very worn crown and one root. Only 1 mm. of the enamel was left. This tooth is very similar to the two incisors from La Quina, but judging from the measurements, more massive; final examinations are pending.
2. Two carpal bones.
3. Several metacarpal bones.
4. Twelve phalanges of the hand, three of them having nails, the last phalanges surprisingly large.
5. The right knee cap, well preserved.
6. Right tibia and fibula, the upper epiphyses of both damaged and partly reconstructed, so that the length and degree of retroversion could be measured.
7. All bones of both feet, except the second phalange of the fifth toe of the right foot. Nine of them partially damaged, the rest well preserved. Total 55 (?) bones. All together 77 (?) bones of an adult were found; all of them very massive and rough. Even at first glance the difference from modern man is very apparent (Plate XIII, *b*).

In general the bones of the Kiik-Koba man are similar to the corresponding bones of the Neanderthal Man, but the measurements disclose their more primitive character. Unfortunately, the material from La Ferrassie, which would be especially helpful for comparison with Neanderthal skeletons, is still unpublished.[1] However, the following figures are given by Bonch-Osmolovsky;

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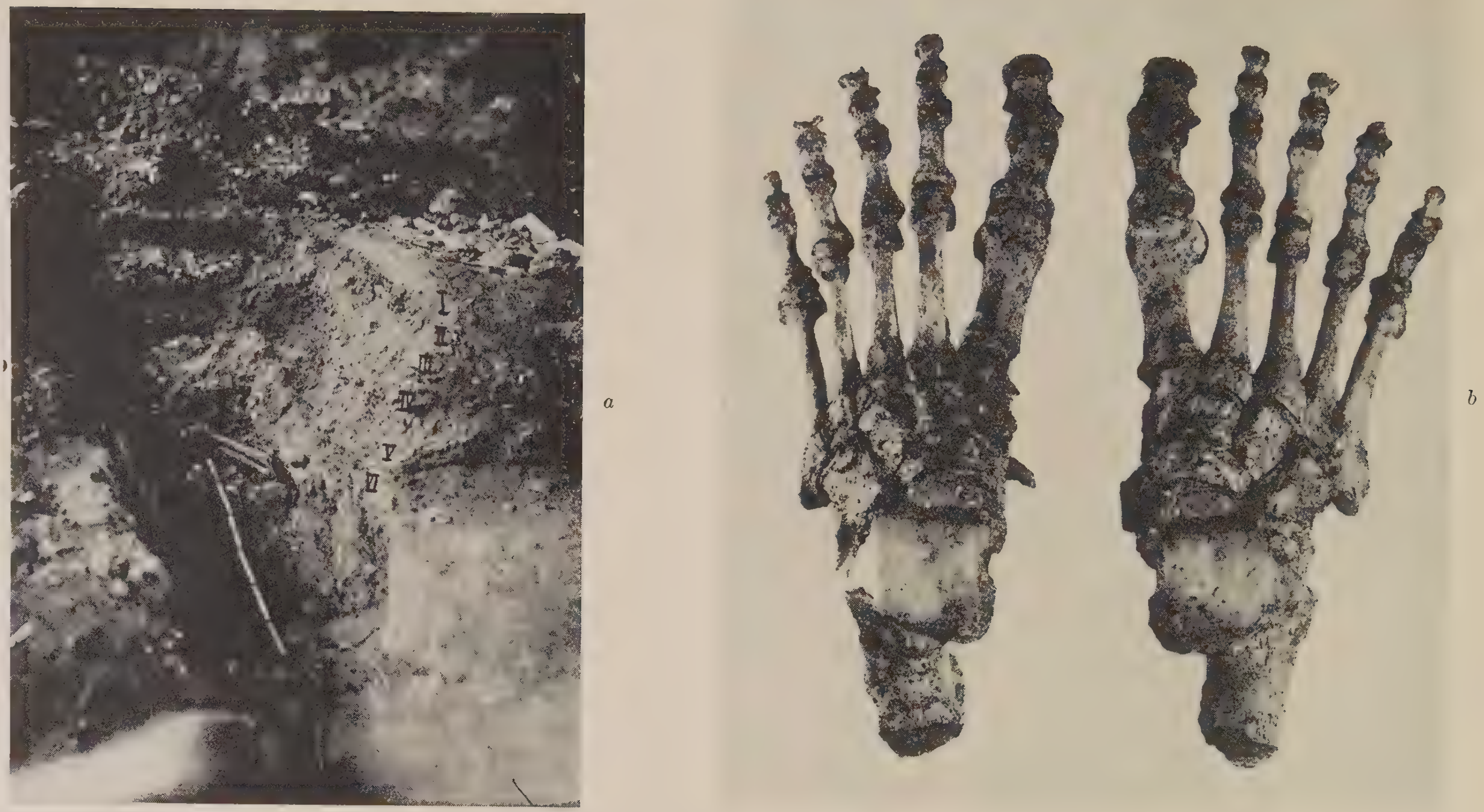
[1] Written by Bonch-Osmolovsky in 1929.

PLATE XIII.



a, General View of the Excavated Portion of Kiik-Koba, Crimea, showing six layers, and human bones found in the lower layer (VI).
b, Part of the Skeletal Remains from the Lower (VI) Layer of Kiik-Koba. After the photos of G. A. Bonch-Osmolovsky.

	Kiik-Koba		Neanderthal	Maximum or minimum of Modern Man after Volkov
The Knee Cap	Left	Right	Right	
Height		52	39	
Width		52	46	
Thickness		28	21	
Tibia				
Length		34.5	34	
Strength index		24.3	24	
Astragalus				
Height-length index	62.5	64.2	61.4	
Width of inner facet	14	13.5	8–11	
Os scaphoideum				
Index of inner and outer thickness	25	27.4	32.7	
Os cuneiformia				
Index of thickness to length	149	154.9		145.6
Os cubideum				
Width-length index	28.4	28.4		27.7
Phalange of the First Toe				
Width to length	52.7	55.3		48.5

In general out of 82 indices computed after Volkov, 68 per cent. are near or over the maximum for contemporary races. From the material existing for comparison, out of twelve Neanderthal skeletons, eight are nearer to modern man than corresponding indices of the Kiik-Koba man. At present it can be said that the hand of the latter was much shorter and more massive than that of Homo Sapiens, in spite of the fact that the nail phalange of the Kiik-Koba man is much thicker. There are also reasons to believe that the opposition of the thumb was much less than it is now.

These facts, in spite of the preliminary character of the information, indicate the importance of the find. Of special interest are the almost complete bones of the feet, which, because of some of the primitive qualities of their form, may very likely add important data to the problem of the evolution of man.

The child's skeleton is nearly complete, except for the lower jaw and teeth. All bones found were in a very poor state of preservation and, consequently, do not have much scientific value.

The excavation of 1925 yielded several additional human bones not included in the above description, an enormous number of animal bones and stone chips. Several very interesting details of the mode of life were observed. A quantity of unbroken animal bones were found stored in the low passage. In one part, a pit had been dug out by the men of the upper hearth, similar to the one which disturbed the burial. Finally, on the side of the entrance, in the lower part of the upper layer of humus, microlithic implements were found.

In summary, Bonch-Osmolovsky gives the following preliminary conclusions:

1. In the cave of Kiik-Koba are two Palaeolithic cultural layers, divided by a long interval of time, but connected genetically.

2. In a culturo-chronological sense, the lower layer may be ascribed to the Lower Palaeolithic, the upper to the beginning of the Middle Palaeolithic.

3. From the point of view of geological chronology, the relative dating of cultures of Kiik-Koba with the corresponding cultures of Western Europe cannot be decided now, because of lack of knowledge of the faunal changes in the Crimea.

4. The human remains, undoubtedly buried there intentionally, are contemporary with the lower layer. Their antiquity, and the fact of the burial in the artificially excavated grave, make this find of distinct scientific interest.

In general similar to the Neanderthal Man, the skeleton shows somewhat more primitive characteristics. The possibility of explaining those primitive traits by individual deviation cannot be absolutely excluded.

These conclusions should be considered as preliminary until further detailed comparison with corresponding West European materials.

4. Wolf Grotto

The site of the Wolf Grotto is near the village of Mazanka (Mazaiha),[1] fourteen miles east of Siempheropol on the banks of the Bieshtiretsk River. It was discovered by K. S. Merezhkovsky [2] during his palaeontological investigations in Crimea (1879–1880).

The Stratigraphy of the site is as follows:

L. Contemporary black soil.
II. Humus.
III. Light greasy clay with debris of limestone.

In this last layer Merezhkovsky found cultural remains consisting of stone artifacts, charcoal ashes and bones of the following animals:

1. *Elephas primigenius,*
2. *Equus caballus,*
3. *Bos* sp.,
4. *Cervus elaphus,*
5. *Saiga tatarica,*
6. *Meles meles,*
7. *Capreolus* sp.

Bones of other animals were found but, unfortunately, Merezhkovsky does not describe them.

The *industry* found by Merezhkovsky is very small in quantity, so that only a general impression can be formed.

The tools are of considerable size, one of them chipped on one side only and the other on both.[3] This is described later by Ephimenko [4] as "a small point of fine Mousterian

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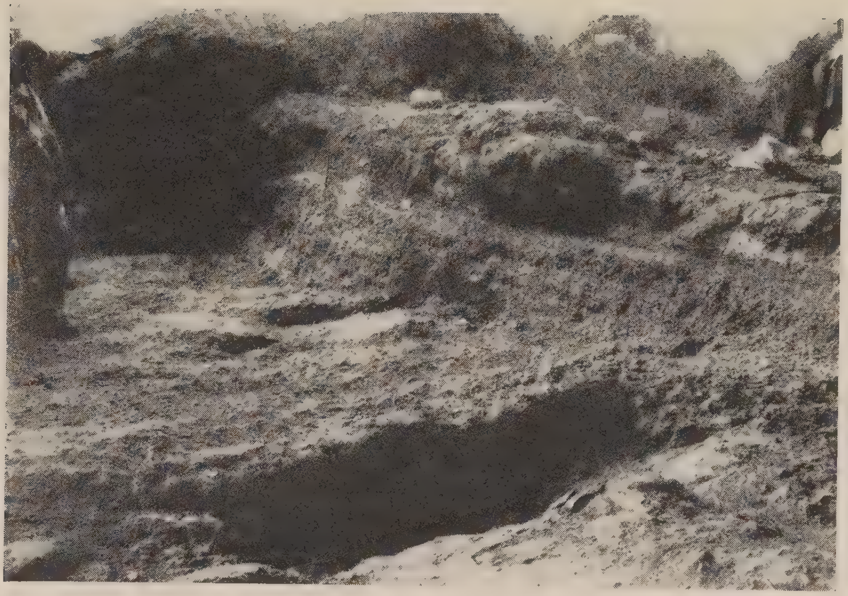
[1] Sometimes referred to in literature as "Bieshtiretsk Cave" or "Masaiha."

[2] Merezhkovsky, K. S., "The Report of the Preliminary Investigations of the Stone Age in the Crimea," Izvestia of Imperial Russian Geographical Society, Vol. XVI, 1880, p. 110; Merezhkovsky, "Station Mousterienne en Crimée," L'Homme, 1884.

[3] Bonch-Osmolovsky, G. A., "The Prehistoric Cultures of Crimea," "Krim," No. 2, Moscow, 1926, p. 86.

[4] Ephimenko, P. P., "Traces of Mousterian Culture in South Russia," Baghalei Memorial Volume, p. 295; also, "Pre-Clan Society," Leningrad, 1936, p. 174.

PLATE XIV.



Neanderthal Grave in the Cave Kiik-Koba, after Excavations. Photo courtesy of G. A. Bonch-Osmolovsky

type," and is also mentioned by Mortillet.[1] Gorodzov [2] and Ephimenko [3] speak of a *coup de poing* of an ancient type, though very small (Fig. 14).

Bonch-Osmolovsky [4] feels that the industry and fauna of the Wolf Grotto are very similar to those of the upper horizon of Kiik-Koba.

Ephimenko [5] points out that the lack of more definite information concerning the fauna and flint industry "aroused many doubts among Russian investigators,"[6] but the discovery of a Mousterian industry in Kiik-Koba and additional excavations in Ilskaya have dispersed these doubts. In this connection he brings to our attention the occurrence of the *coup de poing* both in the Wolf Grotto and Ilskaya (see page 266).

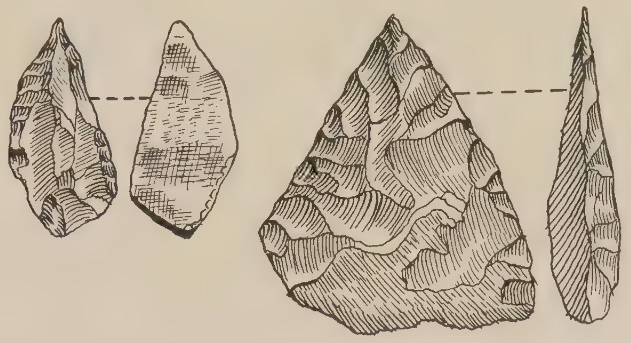


FIG. 14. Point and Handaxe of Wolf Grotto. After Ephimenko, "Pre-Clan Society."

5. CHOKURCHA CAVE

The Chokurcha cave is situated on the steep rocky slope of one of the Crimean chains, stretching southwest for a distance of one-half km. along the left bank of the Malii Sagir River, near the village of Chokurcha, two km. east from Siempheropol.

In front of it there is a small ledge ending in a gentle slope to the river 15 meters below. Judging by the aggregation of cultural refuse and traces of hearth on the plateau and along the slope, prehistoric man lived not only in the cave proper, but also outside of it.

This site was first discovered by Dr. V. V. Lorentz, who called it to the attention of S. I. Zabnin in 1927. The latter made preliminary excavations there with N. L. Ernst and the geologist, P. A. Dvoichenko, in 1928–29.[7]

According to Zabnin, the excavations revealed the following stratigraphy (see ground plan and cross section on Fig. 15).

[1] Mortillet, G. A., "Le Pré-histoire," p. 506.

[2] Gorodzov, V. A., "Archaeology, The Stone Age," Vol. I, Moscow, 1925, p. 172.

[3] Ephimenko, P. P., "Some Results of the Study of Palaeolithic Period in U.S.S.R." Chelovek, No. 1, 1928, Leningrad, p. 50.

[4] Bonch-Osmolovsky, G. A., "Prehistoric Cultures of Crimea," "Krim," No. 2, Moscow, 1926.

[5] Ephimenko, P. P., "Traces of Mousterian Culture in Southern Russia," Baghalei Memorial Volume.

[6] Ephimenko, P. P., "Some Results of the Study of the Palaeolithic Period in U.S.S.R.," Chelovek, No. 1, 1928, Leningrad, p. 50.

[7] S. A. Zabnin, "The Newly Discovered Palaeolithic Site in Crimea," Izvestia of the Tavrida Society of History, Archeology and Ethnography, Siempheropol, 1928, Vol. II, pp. 146–157.

I. *The Top Layer*, consisting of:

(*a*) An upper layer of humus with a large admixture of nummulitic debris. At a depth of 10 meters, bones of modern animals (mostly sheep) were found.

(*b*) Below it, a layer of ashes 25 cm. thick with pieces of Greek pottery, black (?) pottery, two flint flakes, and bones of the sheep, ass, and dog. Near the wall of the cave this layer is 50 cm. thick and in square no. 1–73 cm., sloping down toward the entrance.

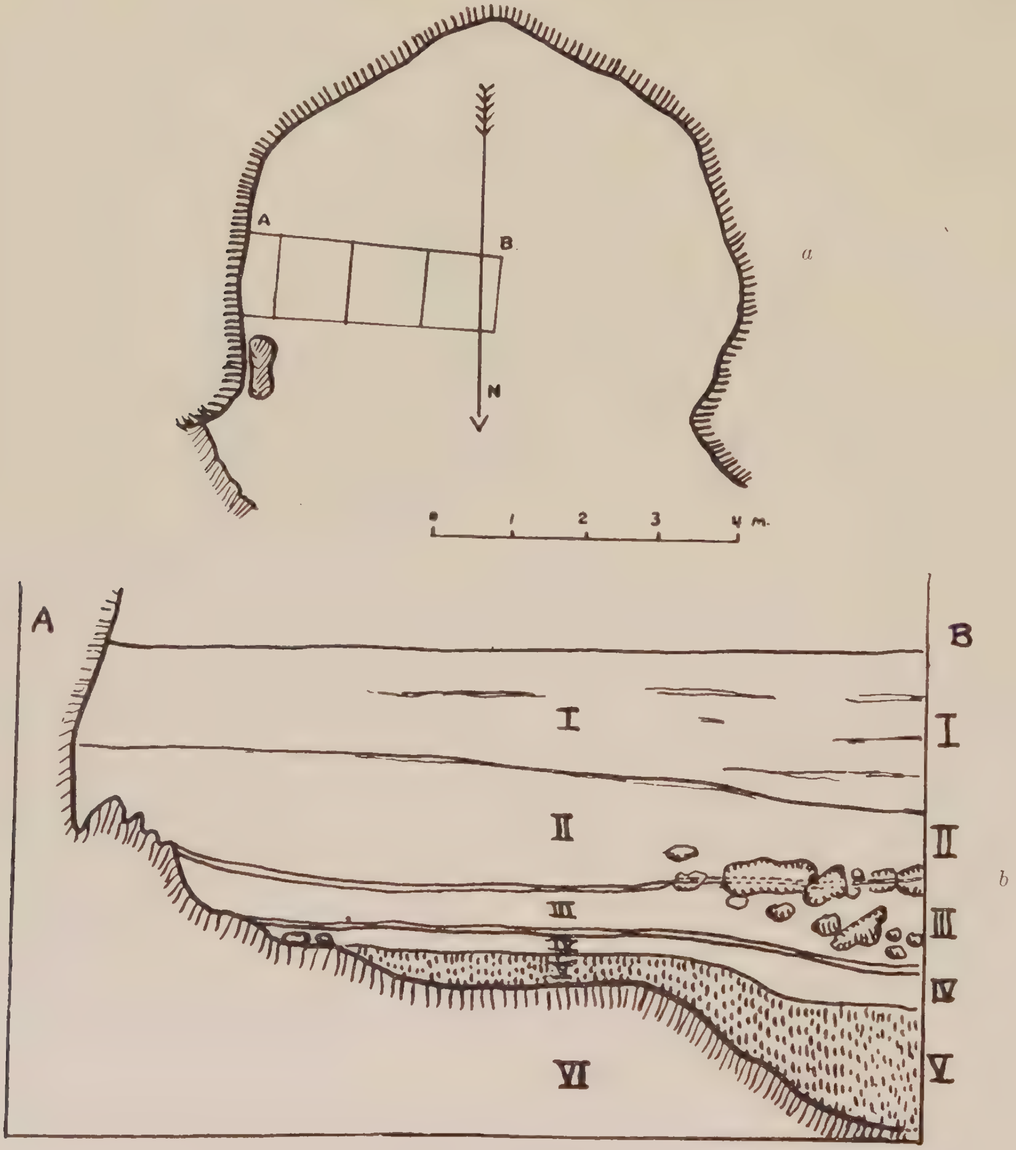


FIG. 15. Ground Plan and Cross-section of Chokurcha Cave. After S. A. Zabnin.

a, Ground Plan. *b*, Cross-section Along the Line *A–B*.

(*c*) A thin layer of charcoal and in the square no. 1 a small "hearth" lying on the strata of Quaternary clay. This "hearth" layer, judging from the pottery, flints and animal bones found, is similar to the Kizil-Koba culture of the Bronze Age.

II. *The Quaternary Clay of Light Yellow Color,* with an admixture of nummulites, 40 cm. thick, consisting of:

(*a*) A layer with large coprolites of the cave hyena and small bones of other animals—10 cm.

(*b*) A layer of large bones, some broken to extract the marrow (?).

(*c*) *An upper cultural layer* (at the depth of 85 cm.) with flint industry and animal bones.

(*d*) A sterile layer 1 cm. thick.

III. *The Middle Cultural Horizon.*

This is a similar layer of Quaternary clay, with a large quantity of nummulites, and a still larger quantity of coprolites of the cave hyena, many small and large bones of the same fauna, and flint implements.

IV. *The Lower Cultural Horizon.*

This lies in the clay containing fewer coprolites, but more flint tools and animal bones.

V. *The Sterile Layer.*

VI. *The Rocky Floor of the Cave.*

Zabnin, in the above classification, distinguishes three separate cultural horizons, though the sterile layer (II-*c*), separating the middle from the upper horizon, is only 1 cm. thick, and no sterile strata between the middle and the lower.

The Lower Cultural Horizon at the IV Layer.

Fauna.—

Elephas primigenius, *Rhinoceros tichorhinus.*

Flint Industry (13 implements and 24 flakes) (Fig. 16).

The implements are of average quality flint of chalk origin and of three colors: gray, black and yellow, the first predominating. No patination is evident.

Nuclei.—Only one was found. It is small, rectangular, elongated in shape, 3.5 cm. long and 1.5 cm. wide, showing the detachment of small blades in all directions.

Hammerstones.—Three river pebbles show traces of use as hammerstones, or possibly in breaking bones.

Flakes.—Flakes of three types: oval, triangular and square, were found. They were 2–2½ cm. long and 2½ cm. wide and ¼ cm. thick. The larger flakes have no definite form.

Points.—

1. Bifacial.
   (*a*) The largest point is triangular in form with an irregular base. It is 5.5 cm. long, 3.5 cm. thick, made of large flake. The lower face is improved by a few strokes, the upper face retouched by rough facets. The shorter working edge is improved by the finer secondary retouch (Fig. 16, no. 1).

(*b*) Similar to the above, but one-half the size, and with a round base (Fig. 16, no. 3).

(*c*) Almond shaped point. The lower face is retouched by large flakes along the edges. The tip of the point and both edges have a secondary retouch. On the left edge of the base is a small coche (Fig. 16, no. 2).

(*d*) Triangular point made of thick flake, the bulb on the lower side and part of the lower face retouched. Both working edges have a secondary retouch.

2. Single faced points.

Made of small thin triangular flake, both edges improved by a fine steep retouch (Fig. 16, no. 5).

Scrapers.—Scrapers are made of both small and large flakes.

1. Made on bi-faceted flake, working edges have a flat retouch (Fig. 16, no. 6).
2. Convex scraper made on a thick oval flake, the upper face high, covered by long facets from the edges to the ridge. It has a convex working edge with a fine, steep retouch.
3. Scraper with the straight edge made of a square flake. The upper face preserves the crust. The working edge opposite the striking platform has a fine flake retouch.

Some of the small scrapers remind one of the "amorphic" culture of Kiik-Koba.

Bone Industry.

No bone objects were found.

Middle Horizon (III Layer).

Fauna.—

1. *Elephas primigenius,*
2. *Rhinoceros tichorhinus,*
3. *Equus caballus,*
4. *Saiga tatarica,*
5. *Vulpes vulpes,*
6. *Vulpes* sp.,
7. *Hyena spelaea,*
8. Large rodent—(?).

Flint Industry. (There are 20 flakes and finished tools.)

The same flint used as in the lower horizon. The flakes are smaller but of the same general form. The leading forms are points of a type somewhat different from those of the lower layer.

1. Longer triangular point, with rounded base, left working edge has a secondary retouch (Fig. 16, no. 7).

2. Similar point made of flat flint pebble preserving the original surface on the lower face (Fig. 16, no. 8).

3. Triangular point with dulled tip (Fig. 16, no. 9).

4. One sided point made from a long flat flake, both edges have a steep retouch (Fig. 16, no. 10).

No scrapers were found in this layer, but one oval pebble, with the traces of possible use as hammerstone, was found.

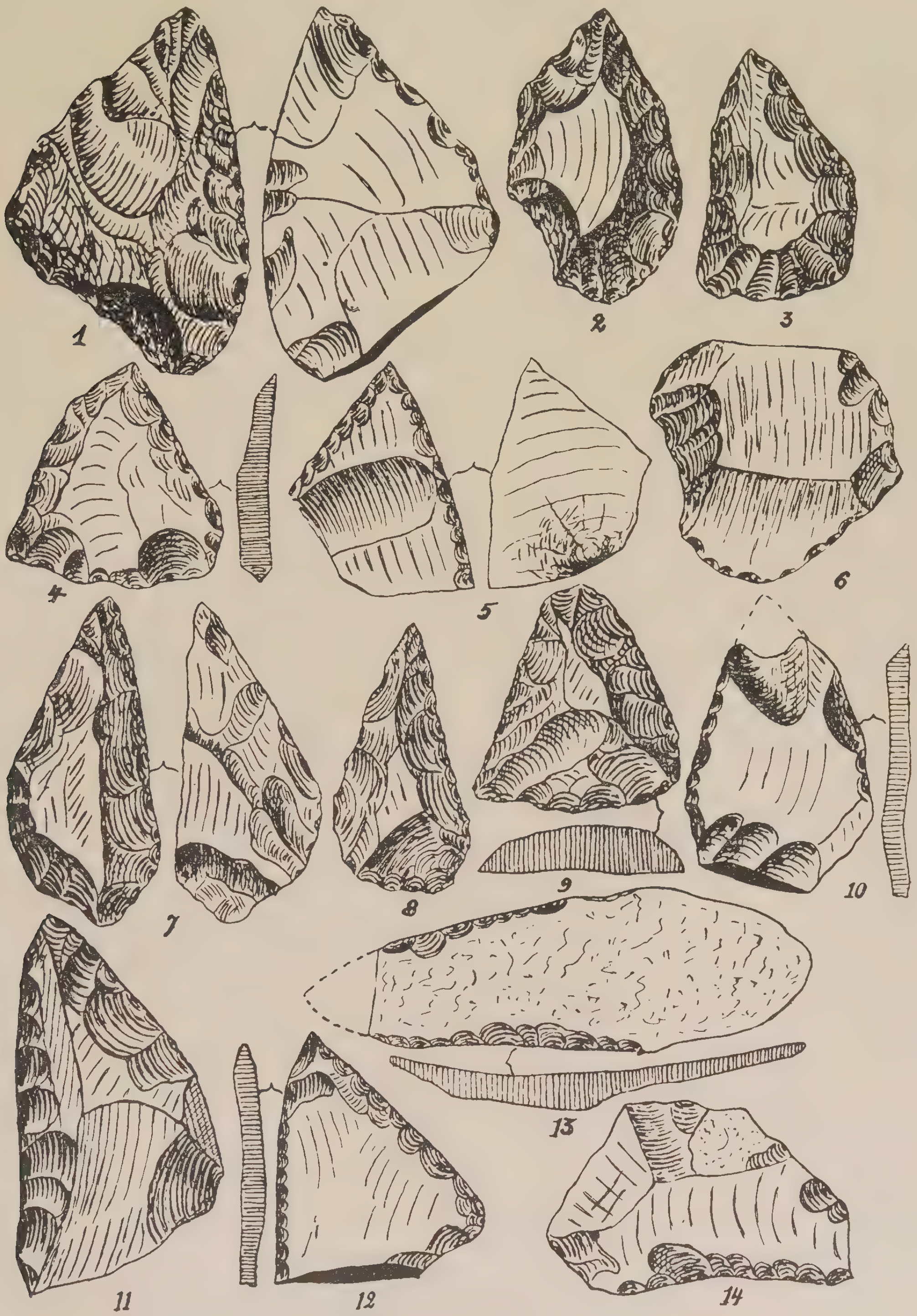

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FIG. 16. The Flint Industry of Chokurcha. After Zabnin.

Upper Horizon (Layer IV).[1]

Fauna.—

1. *Equus caballus*,
2. *Equus asinus* sp.,
3. *Saiga tatarica*,
4. *Vulpes vulpes* sp.,
5. *Ursus spelaeus*,
6. *Lynx* sp.,
7. *Hyaena spelaea*,
8. Two sp. of antelope,
9. Many bones of small rodents.

Flint Industry.—

In quantity the flint industry here is twice that of the middle horizon. The flint is of better quality, mostly black. The flakes are twice the size, flatter and longer.

Hammerstones.—Hammerstones are of the usual type, made of river pebbles.

Points.—Points are the characteristic tools.

1. Made of massive triangular flake with a rounded base. The straight working edge has a small, steep retouch. The other side has a flatter retouch, resulting in a sharper cutting edge (Fig. 16, no. 11).

2. Made of thin triangular flake with a sharp tip, with a similar secondary retouch along both edges (Fig. 16, no. 12).

Scrapers.—There is a large quantity of scrapers made of knife-like blades, both edges of which have a steep retouch (Fig. 16, nos. 13, 14).[2]

Bone Industry.—

A number of pieces of bone with the traces of work, mostly in the form of cuts and notches, were found. In one case the bone has the general form of a point.

Conclusions.—

S. A. Zabnin concludes that the flint industry and fauna of Chokurcha are analogous to the second hearth layer of Kiik-Koba with the following differences:

1. The Quaternary layer of Chokurcha has three well-pronounced horizons, while all of the 25 cm. of the cultural layer of Kiik-Koba represent really only one horizon.[3]

2. No traces of the "Amorphic culture" (Tyasian?) of Bonch-Osmolovsky was found.

As far as the Chokurcha industry is concerned, Zabnin believes that the two lower layers are late Mousterian,[4] because the points found (both single and bi-faced) are made from typical Mousterian flakes, with the characteristic retouch.

However, the long curved knife-like blades made into scrapers, found in the upper part of layer IV, are similar to those of the Aurignacian site of Suren I (see pages 289–293).

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[1] While Zabnin gives a separate list of fauna for each horizon, V. I. Gromov ("Geology and Fauna of the Palaeolithic Period in U.S.S.R.," Problems of the History of Material Culture, Nos. 1–2, Leningrad, 1933) adds for the site as a whole the following:

1. *Sus scrofa*,
2. *Cervus megaceros*,
3. *Canis lupes*,
4. *Lepus timidus* sp.,
5. *Marmota bobac*,
6. *Citellus rufescens*,
7. *Cricetus cricetus*,
8. *Lagurus luteus*.

but does not mention:

1. *Vulpes* sp.,
2. *Equus asinus*,
3. *Ursus spelaeus*,
4. *Lynx* sp.

[2] Zabnin calls No. 14 a "beaked scraper," but it seems to be far-fetched. (E. G.)

[3] S. A. Zabnin is in accord with V. A. Gorodzov, who does not recognize two cultures in Kiik-Koba.

[4] P. P. Ephimenko (Pre-Clan Society, Leningrad, 1936) agrees with Zabnin in spite of the similarity to the upper layer of Kiik-Koba, mostly because it has the character of a hunting society, which according to the Soviet scheme appeared in Mousterian times.

These blades, as well as the primitive bone work, are innovations. The layer is late Mousterian with a suggestion of Aurignacian. According to Ephimenko, evidently during the subsequent excavations of 1929, more bones were found here with cuts, notches, and traces of polishing and use. Finally, and this is especially important, at that time real bone tools in the shape of filed and polished points were found.[1] The latter finds lead Ephimenko to date this site as late Mousterian. On the other hand Bonch-Osmolovsky definitely feels that the lower layers of Chokurcha "*se rapprochent de pres de l'industrie du foyer superier de Kiik-Koba.*" [2]

6. Kosh-Koba

This site is situated in the valley of the Zuya River, 30 kl. east of Siempheropol, in the same rock formation as Kiik-Koba (see pages 240–258).

Investigations show the following stratigraphy:

1. Contemporary black earth.
2. Brown clay 50–150 cm. thick, with pottery of the Kizil-Koba type of the early Iron Age.
3. Thick layer of yellow loess-like clay of Quaternary origin, containing cultural remains.
4. Rocky bottom of the cave, with depression filled with moist and compact clay.

Gromov [3] lists the following fauna, which seems to contain mixed elements of both forest and steppe, corresponding to the supposed climatic condition of the time.

1. *Elephas primigenius,*
2. *Rhinoceros tichorhinus,*
3. *Equus caballus,*
4. *Equus asinus,*
5. *Sus scrofa ferus,*
6. *Bos* sp.,
7. *Cervus elaphus,*
8. *Cervus megaceros,*
9. *Saiga tatarica,*
10. *Canis lupus,*
11. *Vulpes vulpes,*
12. *Vulpes lagopus,*
13. *Ursus spelaeus,*
14. *Hyaena spelaea,*
15. *Lepus europeus timidus,*
16. *Marmota bobac.*

The cultural layers, according to Ephimenko,[4] contained a very large quantity of animal bones, obviously intentionally broken, the remains of two hearths with ashes and burned earth, and a few flint tools.[5]

Gorodzov [6] mentions "bone tools so primitive that, but for the presence of undoubtedly artificial holes, they are not recognizeable as such."

The site is provisionally dated as Mousterian.

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[1] Compare this with Cave Castillo, Spain. Ephimenko, P. P., "Pre-Clan Society," Leningrad, 1936, p. 181.

[2] Bonch-Osmolovsky, G. A., "Le Paleolithique de Crimée," Bulletin of the Quaternary Committee, No. 1, 1929, p. 28.

[3] Gromov, V. I., "Geology and Fauna of the Palaeolithic Period in U.S.S.R.," Problems of the History of Material Culture, Nos. 1–2, Leningrad, 1933.

[4] Ephimenko, P. P., "Pre-Clan Society," Leningrad, 1936, pp. 175–176.

[5] No illustrations are available.

[6] Gorodzov, V., "The Results of the Archaeological Activities in U.S.S.R. during 1917–1930." Manuscript.

7. Gamkovo

The Gamkovo site is located near the village of the same name in the Smolensk region, on the left slope of a gully, which opens into the Ufinia River, the left tributary of the Dnieper. This locality has been known ever since 1909, when it received newspaper publicity because of the discovery of fossil bones.

Since that time, it has been visited by many amateur and professional paleontologists, who made sporadic trial excavations and found numerous remains of Palaeolithic fauna, but no flint industry.

The more careful excavations of K. Polikarpovich, G. Mirchink and A. Lavdansky [1] in 1926 and 1927 established the following geological conditions:

1. Humus,
2. Gray-yellow loess with ferreous spots,
3. Gray-yellow loess with animal bones.

The fauna is represented mostly by *Rhinoceros tichorhinus.* It is interesting that no traces of implements, flakes, chips, or charred bones were found. The large conglomeration of bones, however, may represent one of the bone piles so characteristic of many Russian Palaeolithic sites, which are usually very poor in flint finds. It is possible that the hearths may be situated nearby in some unexcavated portion.

According to Mirchink,[2] the geological age of Gamkovo is somewhere between the end of the Riss and the Würm period. Therefore it is older than the nearby sites of Suponevo, Mezine, Berdizh, Urovichi, and others,—and, perhaps, of Mousterian affinities.

8. Ilskaya

The site of Ilskaya was discovered in 1898 by the famous French archaeologist, Baron G. de Baye.[3] It is situated on the right bank of the Il River, near the village of Ilskaya, Krasnodarsk region, Caucasus, on the 17th section of the Ilskaya oil fields.

News of the discovery spread all over Europe and various authors commented on it from time to time.[4] Baron de Baye did not have the opportunity to continue the excavations, and Ilskaya remained untouched until 1902 when the geologist, N. I. Krishtaphovich,[5] visited the site for the purpose of studying its geological conditions.

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[1] Lavdansky, A. N., "Archaeological Investigation of Palaeolithic Site near Gamkovo, district of Smolensk." Pratzi of Archaeological Committee of Bielorussian Academy of Science, Vol. II, Minsk, 1930, pp. 495–8.

[2] Mirchink, G. F., "Geological Correlation of River Terraces and Palaeolithic Sites in the Basin of the Desna and Sozh Rivers," Bulletin of Moscow Society of Naturalists, Vol. VII, Moscow, 1920, pp. 1–2.

[3] de Baye, G., "Au Nord de la Chaine du Caucase," Revue de Géographie, 1899, July–August, p. 13.

[4] Volkov, Th., "L'Anthropologie," Vol. IX, 1898, p. 617.

Volkov, Th., "Materials for Ukrainian Ethnology," Vol. I, 1899, p. 221.

Volkov, Th., "Annales Archeologique de la Russie du Sud," 1889, pp. 74–75.

Capitan, L., "Etudes sur les collections rapportées de Russie par M. le Baron de Baye," Bull. de la Soc. d'Anthr. de Paris, t. X (IV^e serie), fasc. 4, 1899, pp. 322–327.

[5] Krishtaphovich, N. I., "Geological Investigations of the Palaeolithic Site during the Summer of 1904." "Drevnosti," Trudi of Moscow Archeological Society, Vol. XXI, Part 2, p. 183.

In 1925, S. N. Zamiatnin [1] was able to identify the place of the original excavations of deBaye, carried on rather extensive excavations in 1926, and 1928. The results are published in the Revue Anthropologique, and, therefore, are available for Western European scholars. Still, because of the fact that Ilskaya has aroused quite a controversy among the Russian archaeologists (see the opinion of Gorodzov as given at the end of this chapter), it was felt that an almost literal translation instead of a broad summary should be given here.[2] According to Mr. Zamiatnin, we have the following situation:

The winding river actually passes through the alluvial region composed of clay and gravel, which forms the first terrace 5–6 m. above the river. The second terrace, about 20 m. high, is less easily visible, as it is often masked by fluviatile deposits; it is more pronounced on the right bank. The site itself is situated on the left bank of the river, on the edge of the second terrace, past the oil wells Nos. 171–172.

The fluviatile deposits differ in the nature of their composition, but consist for the most part of brown or bluish clay, sometimes mixed with chalk (?), and their thickness increases as one goes farther from the river. The cultural deposit, averaging 40–50 cm. in thickness, is almost horizontal, with a very slight inclination toward the river. It contains a large quantity of artificially broken bones, stone implements, flakes, and chips. On the edge of the terrace, this layer, where it appears near the surface, gives the impression of being subjected to water action; there one could find fewer remains of human industry.

There were no definitely determined hearths found, and the objects were quite uniformly distributed. Still it is interesting to note one peculiarity of this distribution: i.e., while the parts of the layer in which large bones predominated yielded fewer stone implements, there were usually several finished tools. On the other hand, those spots where there was a predominance of stone implements, flakes and nuclei, contained, in most cases, only a limited quantity of broken bones. The majority of the nuclei were all found in a rather small area. This peculiar fact, which can be observed more clearly in the Upper Palaeolithic stations of southern Russia, gives hope of discovering some traces of the camps of Quaternary hunters.

A surface of 170 sq. meters was excavated by Zamiatnin. According to Mme. V. J. Gromova, assistant of the Zoological Museum of the Academy of Sciences, the fauna of this station is represented by:

Elephas primigenius [3]
Equus sp.[4]
Bos primigenius [5]
Hyena.

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[1] Zamiatnin, S. N., "Station Moustérienne à Ilskaia province de Kouban (Caucase du nord)," Revue anthropologique, Nos. 7–9, 1929, pp. 282–295.

[2] Mr. Zamiatnin has kindly placed at author's disposal a set of photographs of the Ilskaya flint industry. These are reproduced here (Plates XV and XVI) in addition to drawings, because of the importance of the site, in spite of the fact that there are some duplications: Specimen on Plate XV, no. 13, is reproduced in drawings on Fig. 18, no. 11; no. 14 is reproduced in drawings on Fig. 18, no. 9; no. 12 is reproduced in drawings on Fig. 17, no. 3; no. 1 is reproduced in drawings on Fig. 17, no. 8; Plate XVI, no. 1, is reproduced in drawings on Fig. 17, no. 7; no. 2 is reproduced in drawings on Fig. 18, no. 6.

[3] Gromov, V. I. ("The Geology and Fauna of the Palaeolithic Period in U. S. S. R." Problems of Gaimk, no. 1–2; 1933, p. 27), adds the following: *Equus asinus, Sus scrofa ferus, Cervus elaphus, Megaceros sp., Canis lupus, Ursus spelaeus, Hyaena spelaea.*

[4] *Equus equus*, according to Gromov, V. I.

[5] *Bison priscus*, according to Gromov, V. I.

Bos species were of a smaller size than *Bos primigenius*. The bones of *Bos* species predominate, but the almost complete absence of horns in the layer makes more precise identification of this species very difficult.

The industry of this site is represented by a collection of about 300 tools, numerous nuclei, and a very large quantity of flakes, chips, etc.

The implements are characteristically Mousterian, but with some points of differentiation. There is an abundance of implements of exceptionally small size (averaging 5–6 cm.) chipped on both sides. In spite of the small size most of these implements are rather thick. This specific characteristic of the industry is often explained by the nature of the material used. The formations of the neighbourhood of Ilskaya do not offer anything but dolomite, flint and limestone. Because of its fragility the first is not very suitable for the manufacturing of tools; it is often found in this site in the form of flakes and finely retouched blades; those of larger size are especially noticeable. Finished tools of this material are exceptional.

The chief material for the Ilskaya industry is black jasper (lydite) and "horned flint" (hornstein). Chalcedony, carnelian, quartz, quartzite, and hard sandstone were also used. But in the vicinity of Ilskaya these materials are found only in the form of small pebbles in the bed of the Il River. The size of these pebbles determines the size of the tools. Almost every implement of Ilskaya preserves part of the polished and flattened surface of a pebble. The collection contains a considerable series of nuclei (about 50) of typical discoidal form (Fig. 17, nos. 2, 3). In this series the nuclei are quite similar, but one can distinguish several groups. One includes the more massive types, of special form (Fig. 17, no. 1). Another very interesting type is those of exceedingly small size, with the flakes of so minute that they could not have had a practical use. These nuclei could be regarded as "ebauche" of small amygdaloid tools, described below (Fig. 17, no. 4).[1] Finally, it is necessary to mention a considerable group of relatively small pebbles from which only one or two large flakes have been detached (Fig. 17, no. 5).

There are many examples of small ovoid pebbles, preserving on the ends traces of numerous blows. These served as hammer stones and, perhaps, were used for making tools. Their surfaces show characteristic scratches (Fig. 18, no. 12).

The *flakes* and *blades* used for manufacturing were triangular and produced large, short and usually massive implements. The striking platform is large and the bulb of percussion is strongly pronounced; when interfering with the handling of the implements, the bulb was often chipped off by one or several blows (Fig. 18, no. 6). A large quantity of flakes and blades had facets on the striking platform. Among the large flakes several were of flint, dolomite, and quartzite, approaching the type of Levallois. On the other hand, one also finds a certain number of long straight blades, which recall Upper Palaeolithic types.

As we have already noted, part of the industry of Ilskaya was made not on flakes or blades, but directly on pebbles of appropriate size worked on both sides. Among the tools which preserve the Lower Palaeolithic traditions, it is necessary to mention a group of twenty small, carefully made amygdaloid implements, derived from the Acheulean *coup de poing* (Fig. 17, nos. 8, 9). The largest one is but 6 cm. long. The fact that one of the sides is convex and the other is more or less flat is characteristic. They are usually chipped with large facets. In making this implement the lower side was chipped first.[2]

[1] Probably disk-nuclei. (E. G.)

[2] Compare with ebauche-nucleus (Fig. 17, no. 4). (E. G.)

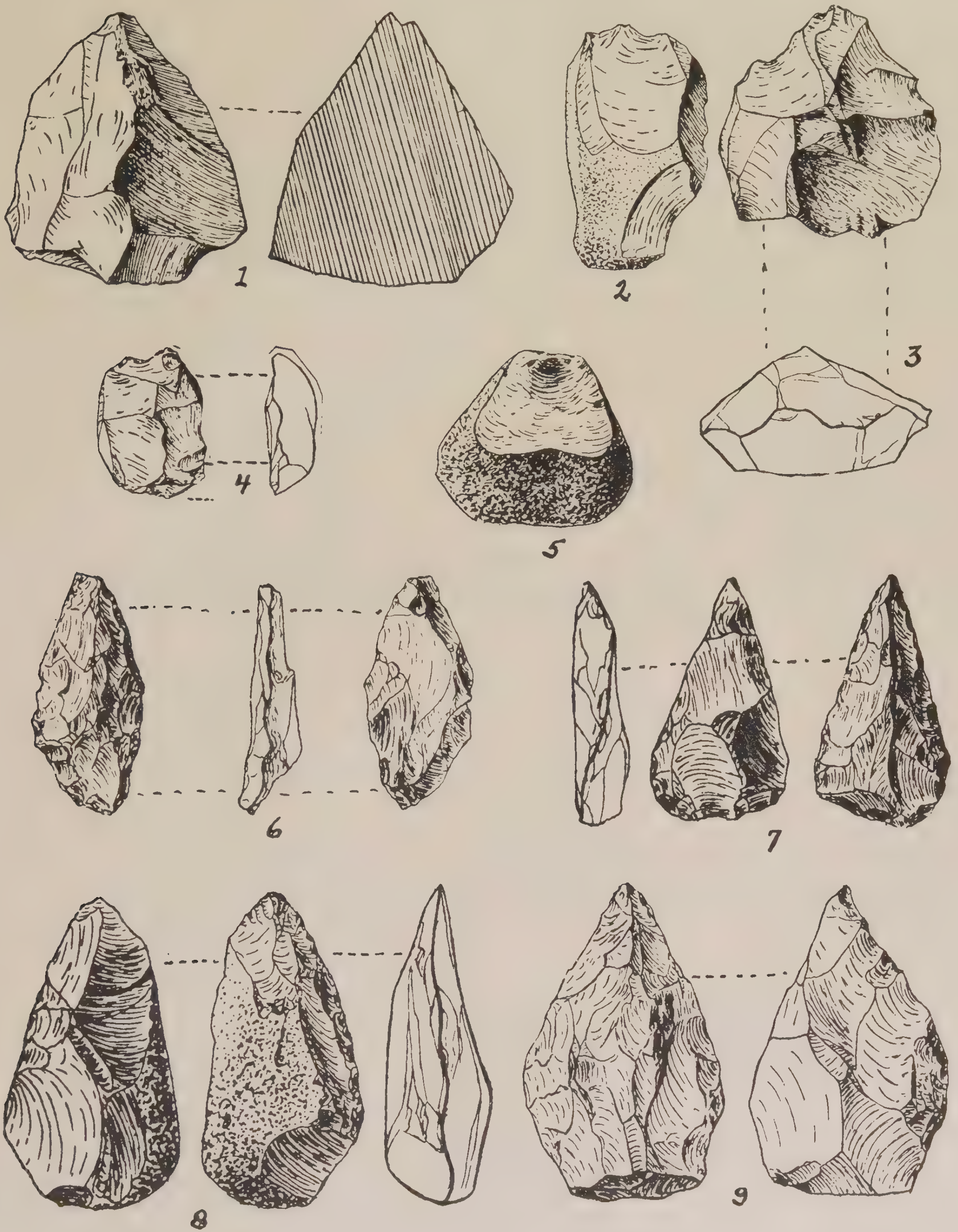

FIG. 17. Flint Industry of Ilskaya. After Zamiatnin.

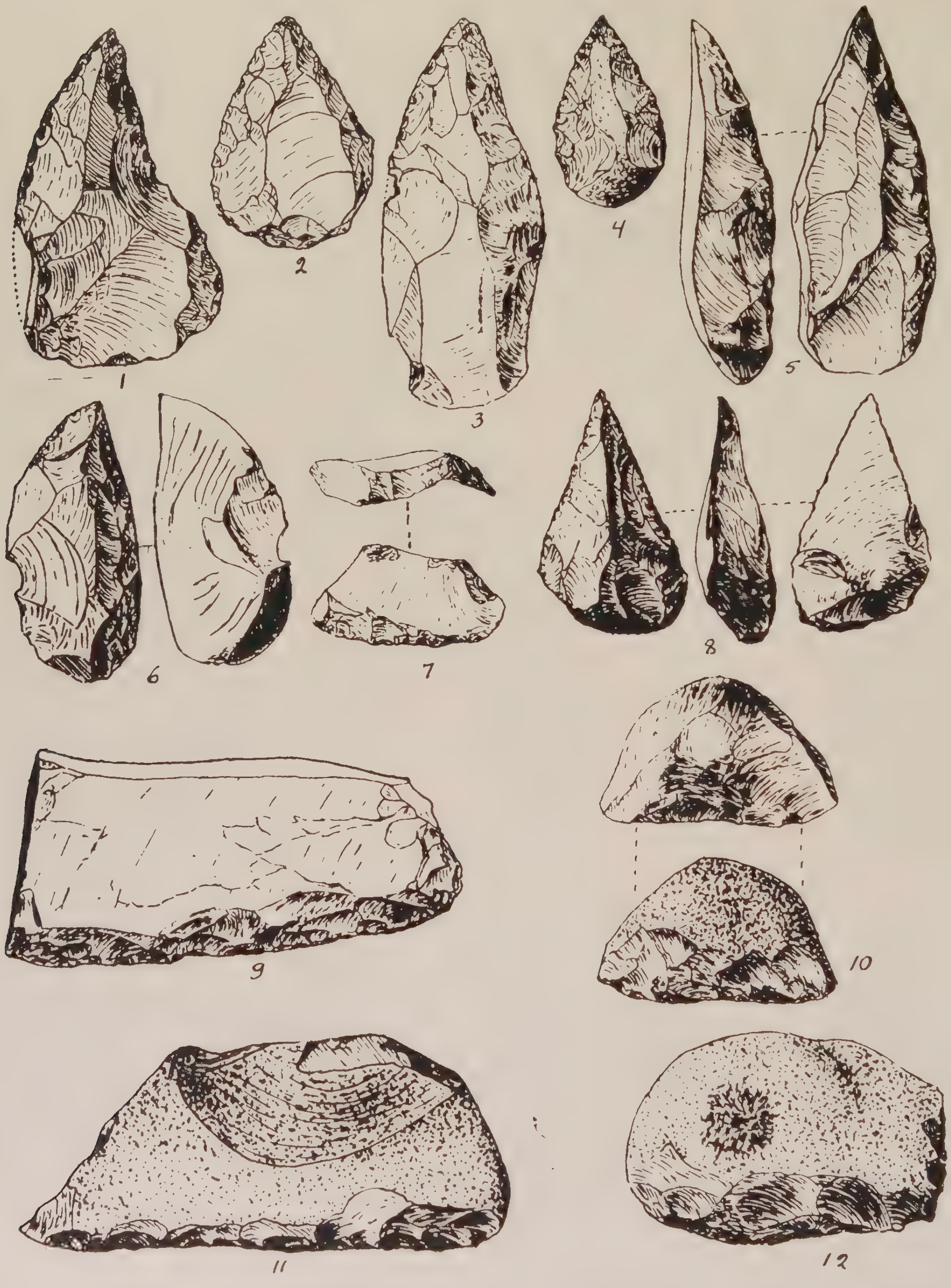
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Fig. 18. Flint Industry of Ilskaya. After Zamiatnin.

The convex side always has a fine and careful retouch along the edges which is sometimes carried all around the implement. This peculiarity, together with the dimensions of the objects, clearly indicates that those tools, though morphologically related to the large, almond-shaped tools of the Lower Palaeolithic, nevertheless had the same purpose as Mousterian points.

Another group of implements, with a similar bifacial chipping, have asymmetrical contours. The majority of them are made of pebbles, and some of massive flakes. They are characterized by the fact that more careful retouching is found only on the point and on one end of the upper surface.

The Points (about 100) form the most numerous group of the Ilskaya industry. They are always very finely and carefully retouched at one end, and on one or both edges. Made of fine blades, or flakes with the prepared striking platform, they can be divided into the following groups:

(*a*) Implements made from triangular flakes, fairly large and thin, retouched on both edges with the point in the middle (Fig. 18, nos. 1, 2). Most of them are 4–5 cm. long and only a few range from 6–7 cm. These beautiful implements repeat in miniature the classical forms of Mousterian points.

(*b*) Long points, made usually on fine blades, are less abundant (Fig. 18, no. 3).

(*c*) Lance-like points, usually made of the first flake of the pebble with the cortex partially visible, are quite common (Fig. 18, no. 4).

(*d*) Implements (pointed side scrapers) with the point inclined toward one edge which is retouched along the whole length; the other edge is retouched only partially (Fig. 18, no. 6).

(*e*) Small tools remarkable for their thickness, with a long straight point in cross-section, like an isosceles triangle with shortened base. These tools probably were used as perforators (Fig. 18, no. 8).

Although the *Side Scrapers* of Ilskaya are almost as abundant as the points, they are less varied. They are usually slightly larger than the points (Fig. 18, nos. 9, 11). Those measuring 6–8 cm. are as numerous as the small ones. They can be divided into two groups: (*a*) those with a straight edge, (*b*) those with a curved edge. One can also distinguish some made of small flakes, the form of which is less regular (Fig. 18, no. 7). There are also many side scrapers chipped on the lower side (Fig. 18, no. 10). Some are double tools, with one of the edges retouched on the upper convex side, while the other is retouched on the lower side (Fig. 18, no. 12).

A number of flakes and blades found in Ilskaya, long and narrow in shape, and more or less regular, retouched on one or both sides, can be regarded as either a special type of side scraper, or a simple cutting tool.

Perforators are represented by a small number (10–15). They have no definite form. They are all small, made of thin flakes of accidental form and little regularity, transformed into perforators by very little retouch. Several smaller points can be included in this group.

There is also a considerable quantity of tools of indefinite and irregular form, perhaps simple flakes barely marked with retouching strokes.

Finally, some tools of specific form, which cannot be included in the above series, must be described. Among these there are, first of all, two double points which resemble the tools of this type from La Quina, Ehringsdorf and Karlstein.

The first, 10.5 cm. long, 4 cm. wide, Plate XVI, no. 8, is the largest stone tool of Ilskaya. It is made of a long flat pebble of grey-brown granular sandstone. Its outline, resembling the Solutrean laurel-leaf point, makes its appearance in Ilskaya quite unexpectedly; only the technique of its manufacturing connects it with this site. The upper part of it preserves a considerable portion of the smooth surface of the pebble and it is retouched only around the edges. The whole lower side is chipped with large facets. Its very regular shape at first glance gives the impression that this point was fixed to a handle, but closer examination shows that the one side of the upper surface is carefully retouched, forming a finely curved cutting edge. It is thus possible to assume that this tool was used as a side scraper. It may be compared with a large one found in the cave of Kulna (Moravia) and described by H. Breuil.

The second double point is small (6.5 x 1.5 cm.), relatively thick and straight. It is made of a broken pebble of grayish sandstone, its thickness reminding one of the point-perforators described above. The ends and sides are carefully retouched, the lower surface is flat.

The third implement, less common, is likewise made of a broken pebble of fine, fawn colored sandstone. The lower surface is flat and not retouched. The upper surface is very convex, preserving the cortex in one small part and is retouched with fine facets. The retouch of its sides is perfect. One of the ends is sharpened to a thick point or perforator, the other, chipped in a semi-circle, forms a regular convex scraper equally thick.

A careful examination of those three objects permits one to connect their technique very closely with that of Ilskaya; their extraordinary form is easily explained by the fact that they were made of pebbles.[1]

There are very few traces of bone work in Ilskaya. Among the large number of artificially broken bones there is only one which bears unquestionable traces of work. Typically striated, it is similar to the "anvils" or "compressors" found by Dr. H. Martin in La Quina, and known also from other sites of this period.

In addition, there were found the second phalange of an adult Bovidae, perforated along all its length, and the cervical vertebra, likewise perforated, of the same animal. The bad state of preservation of these two specimens does not permit one definitely to recognize the work of man in them.

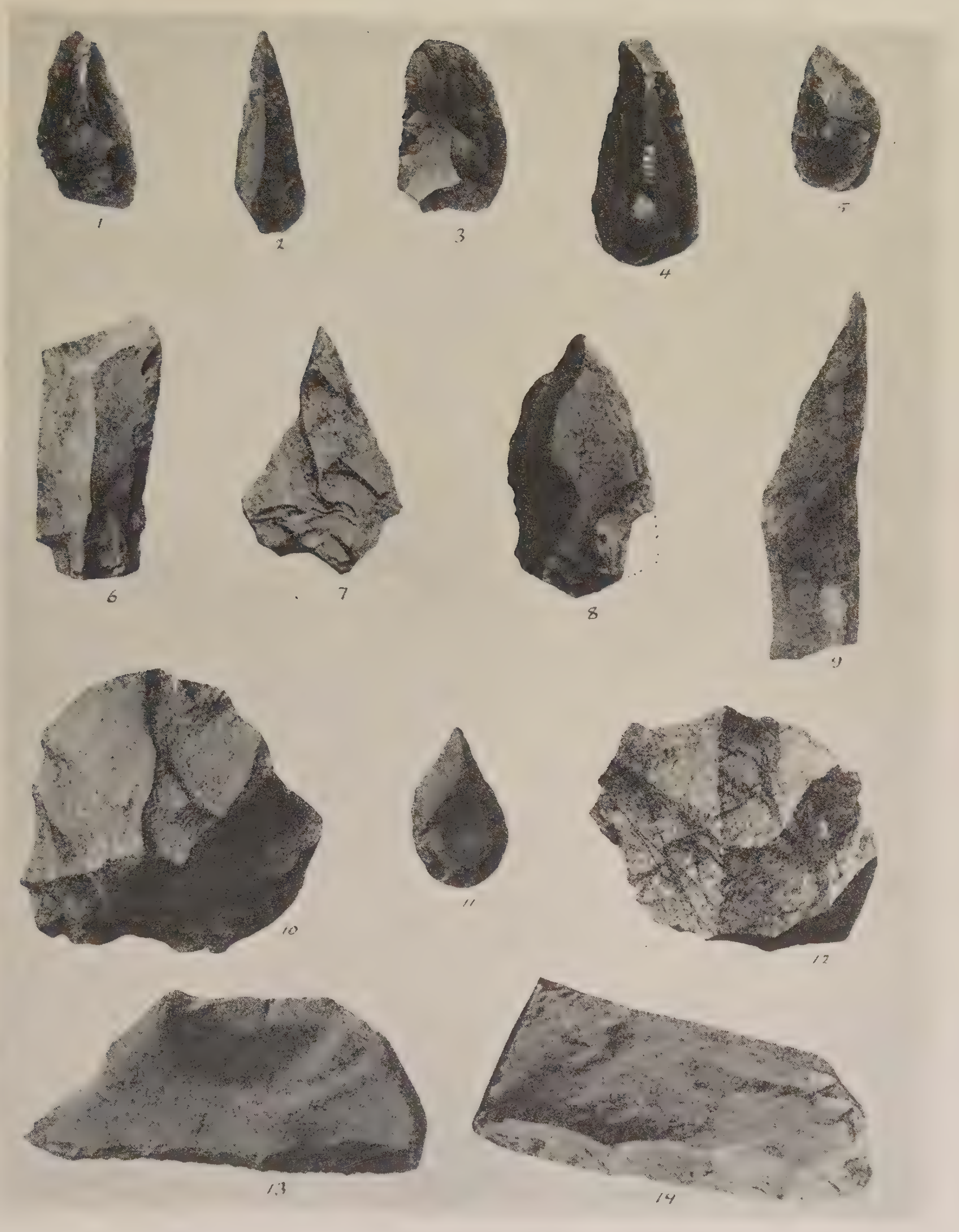
Considering the industry of Ilskaya in its totality, represented by the massive tools, small *coups de poing* and tools worked on both sides, Zamiatnin feels that it should be included in the special group of Eastern Mousterian sites and also apparently connected with La Micoque culture.

The area of the distribution of this culture includes Germany, Austria, Moravia, Poland, Hungary, Transylvania[2] and stretches through Ukraine of South Russia to Ilskaya of the North Caucasus. But all these sites, scattered over this enormous territory are not synchronical. Except the most ancient sites of the warm fauna, they appear to belong to the different phases of Mousterian. An exact study of their chronological relationship

[1] Unfortunately Zamiatnin does not give illustrations of these interesting implements. (E. G.)

[2] A number of Transylvanian sites recently discovered resemble Ilskaya, not only by the aspect of their industry, but also by the main material employed. Unfortunately, they are represented only by a small number of objects. (Breuil, H., "Les stations paléolithiques en Transylvanie," Bull. de la Soc. des Sciences de Cluj, t. II, 1926, pp. 192–217.)

PLATE XV.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Flint Industry of Ilskaya. Unpublished photographs of Zamiatnin.

presents great difficulties and, up to the present, has resulted only in contradictory conclusions. This question is also complicated by the fact that a large number of finds are represented only by isolated objects or by a very small series, which does not permit one to form an adequate idea of the cultural complex.

It is necessary to be very cautious in specifying the chronology of Ilskaya, especially because this Mousterian site, is at such a distance East, from all the other sites with which it could be compared. Still, it can be considered characteristic of the evolution of the Eastern Mousterian.

Several facts already pointed out indicate that the age of Ilskaya is not very ancient:

(*a*) The most archaic forms, such as the small *coup de poing* with the convex side very carefully retouched and the lower one retouched with large flakes, point to a use analogous to that of Mousterian points; they are the same implements, but made with the later technical processes.[1]

(*b*) The typical forms, as well as variation of Mousterian points are the most abundantly represented implements of Ilskaya.

(*c*) A large number of implements and flakes show a careful chipping of nuclei and the presence of facets on the striking platform.

(*d*) The appearance of the first traces of bone work.

The next problem is to compare Ilskaya with the geographically nearest Mousterian sites of South Russia.

I. The Wolf Grotto near Siempheropol, discovered in 1881 by K. S. Merezkovsky, yielded rich faunal remains, many worked flints, a triangular *coup de poing* and a fairly large point.[2]

II. The grotto of Kiik-Koba, discovered and investigated in 1924–25 by G. A. Bonch-Osmolovsky, consists of two archaeological layers of different ages: the lower layer with atypical industry of primitive Mousterian,[3] represented by irregular flakes very slightly retouched, does not contain any definite types outside of small *coups de poing*, crudely retouched. In the same layer were found bones of Neanderthal man. The upper layer presents an industry much richer in form, and nearer to that of Ilskaya; there is the same predominance of points, the same flat-faced *coups de poing*. On the basis of notes furnished by Mr. Bonch-Osmolovsky, Zamiatnin makes the following distinction: nuclei richly represented in Ilskaya are absent in Kiik-Koba; on the other hand, implements retouched on both sides are much more numerous. This may perhaps indicate that the upper layer of Kiik-Koba is somewhat earlier than Ilskaya.

III. A third and the most interesting find, was made in 1924 by Professor P. P. Ephimenko, in the open site on the bank of the Derkula River, not far from its junction with the Donetz in the region of the Don, almost on the border line of Ekaterinoslavl province. One very large nucleus (about 25 cm.) of greenish quartzite was found there, as well as many large flakes of the same material, and two large implements: a side scraper and a point of gray flint with fine, beautiful retouch. The station of Derkula is evidently the most recent Mousterian site in South Russia. Its industry differs from others by the large perfect implements, recalling classical Mousterian types.

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[1] It is very interesting to note that in a much later epoch the "laurel-leaf" point of Hungary and of Predmost derived, as was well established by H. Breuil, of flint Mousterian tools, shows analogous peculiarities of manufacture. It is very probable that the technique of these "laurel-leaves" is the result of a tradition of this epoch. (Breuil, H., "Voyage paléolithique en Europe Central," L'Anthrop., t. XXXIV, p. 522, fig. 4.)

[2] Merezhkovsky, K. S., Station moustérienne en Crimée (L'Homme, 1884, pp. 300–302).

[3] Tyasian. (E. G.)

All these finds permit one to follow the evolution of Mousterian cultures in South Russia. The site of Ilskaya, as well as two caves in Crimea, apparently belong to the same group of cultures, as they are similar in character. The most ancient stage is represented by the two layers of Kiik-Koba.[1]

Ilskaya closely resembles the upper horizon of the latter; in the opinion of Zamiatnin, it immediately follows Kiik-Koba.

The finds of the Wolf Grotto should be placed in a somewhat later, more evolved stage. However, this succession of cultures does not embrace all the Mousterian cultures of Eastern Europe.

During the fall of 1928, Mr. Zamiatnin continued his work in Ilskaya for one and a half months. He states that his finds furnish additional interesting details and considerably increase his collection. He believes that this additional material confirms his general conclusions.

The position taken by Zamiatnin seems to have been supported by P. P. Ephimenko,[2] who, even previous to the last excavations, classified Ilskaya as Mousterian on the basis of the material of de Baye. In his other article,[3] knowing the results of Mr. Zamiatnins' excavations, he confirms his conclusions, and places Ilskaya somewhat later than the upper horizon of Kiik-Koba on the basis of the appearance of a scraper point made on regular prismatic flakes.

However, V. A. Gorodzov,[4] though fully aware that all previous investigators have dated Ilskaya as Mousterian, disagrees with them. He writes: "All investigators agree in dating it as Mezolithic [5] (Mousterian). Still, among the industrial material collected by the efforts of S. N. Zamiatnin, forms were present which definitely indicate that it belongs not to the Mousterian, but to the Upper Palaeolithic epoch.

"Such forms are:

"(*a*) Miniature stone nuclei with narrow facets worked by pressure, introduced not earlier than the beginning of Aurignacian.

"(*b*) A very well developed form of high scraper (*grattoir carené*) which appears for the first time in the middle horizon of Upper Palaeolithic (Upper Aurignacian).

"(*c*) A leaf-like blade (*point de sagaie en feuille de laurier*), the characteristic form for the middle horizon of the middle time (Upper Solutrean) of the Palaeolithic, found for the first time in Eastern Europe.[6]

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[1] Bonch-Osmolovsky, G. A. believes the lower layer to be lower palaeolithic (Tyasian) and the upper layer La Micoque, considering it the most ancient stage of Mousterian. (E. G.)

[2] Ephimenko, P. P., "Traces of the Mousterian Epoch in Southern Russia," Baghalei Memorial Volume, Kiev, 1927, p. 294.

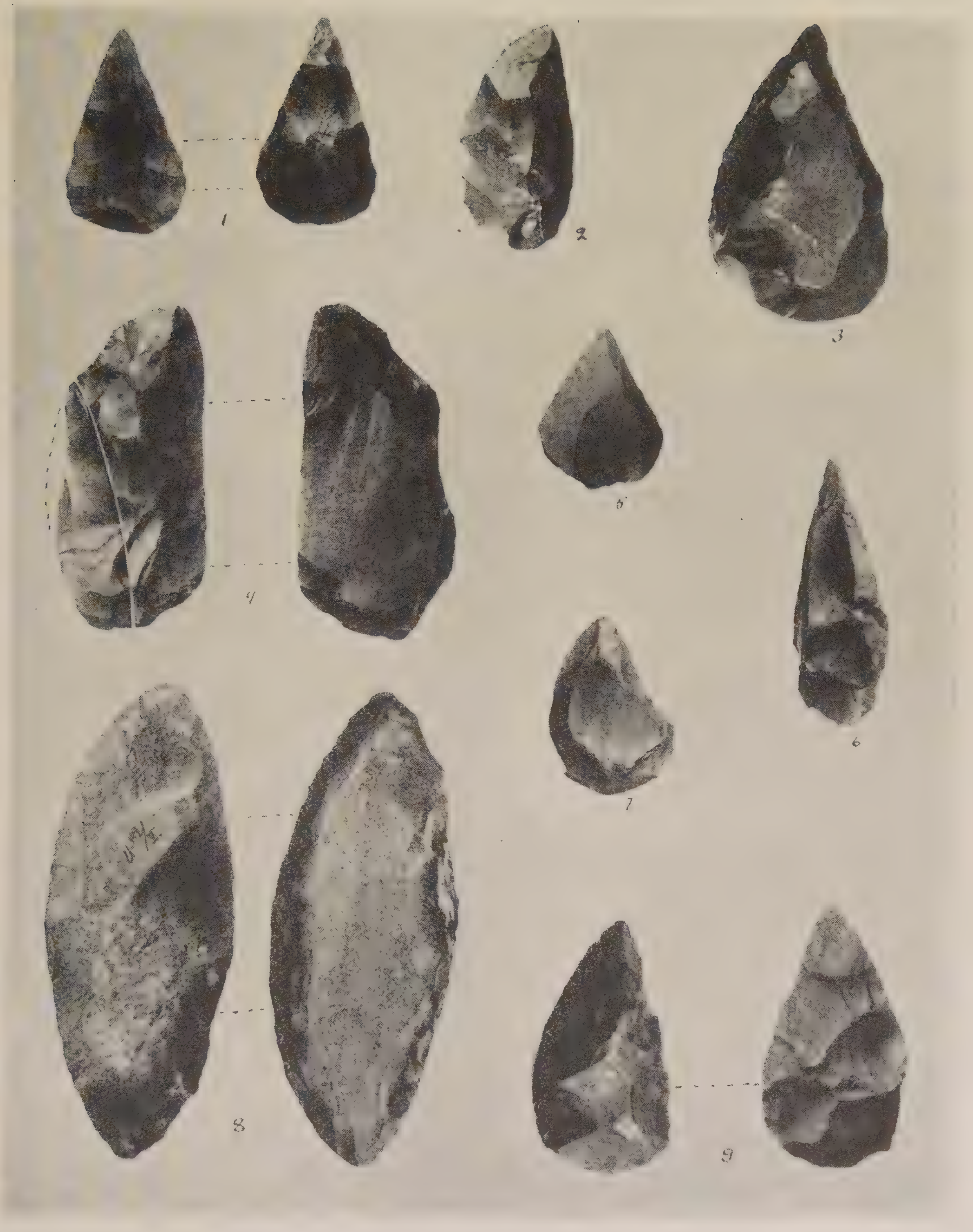
[3] Ephimenko, P. P., "Some Results of the Study of the Palaeolitic Period in U.S.S.R.," "Chelovek," No. 1, Leningrad, 1928, p. 50.

[4] Gorodzov, V. A., "The Results of Archeological Activities in U.S.S.R. During 1917–1930." Manuscript, pp. 17–19.

[5] Gorodzov's classification equivalent to Mousterian. (E. G.)

[6] Only the form, but not the technique. (E. G.)

PLATE XVI.



Flint Industry of Ilskaya. Unpublished photographs of Zamiatnin.

"(*d*) On September 12, 1928, in the presence of the author, during the excavations of S. N. Zamiatnin, there was found the miniature nucleus (about 2 cm. high) of the black jasper (lydite) from one side of which had been separated several flakes of microlithic form.

"It is clear that this station belongs to the middle horizon of the middle time of the Palaeolithic (Middle Solutrean).

"The explanation of the co-existence of the archaic forms of older periods with the latter ones was given by the author[1] in the work devoted to the Yenisey Palaeolithic, especially in reference to Afontova Gora in Krasnoyarsk, where archaic forms were also found. The reasons for dating this station as Mousterian are examined and it is pointed out that this site also belongs to the middle horizon of the middle times of the Palaeolithic epoch (Magdalenian).

"It should be pointed out that in Ilskaya, as well as in Afontova Gora, the surviving archaic forms were made, not of flint, but of other rock formations which gave rougher fractures, and by its archaic appearances, led very experienced investigators into errors."

It should, perhaps, be mentioned again that Professor Gorodzov is stressing the formal typological approach, as contrasted with an evaluation of the cultural complex as a whole.

Mr. Zamiatnin reproduces in his illustrations (Fig. 17, no. 4) the miniature nucleus of black jasper with fine facets, and in his photographs, which he so kindly furnished me, he gives a "laurel-leaf" form of point, Plate XVI, no 8. Still, the rudeness of the work and the impression of accidental similarity persists. The author is inclined to accept Mr. Zamiatnin's point of view and considers Ilskaya as a peculiar Eastern development of Mousterian culture.

9. DERKULA

This site is situated on the bank of the Derkula River where it joins the Donetz River, near the border of Ekaterinoslavl province in the Don region.

The discovery was made by P. P. Ephimenko,[2] a summary of whose description is given below:

Geology.—The natural cross-section of the bank reveals a chalky bed, covered by a very uneven layer of dark marl, containing many worn chalk pebbles, and pieces of chalky flint, washed out of the lower strata.

The surface of the marl is very irregular, forming high elevations and deep depressions (Fig. 19).

The sand deposit which covers the marl is divided into two horizons. The lower part, which lies immediately over the marl, is a clean quartz sand which fills the uneven surface of the marl stratum. In it are incrustations of small worn flint pebbles.

It is evidently the bottom of an ancient river terrace (6 meters above the present river level). The Derkula cut its bed deep in the marl and deposited sands at the time when it was a large flowing stream.

At a height of 9 meters above the river there is a thin horizontal layer of small, very much worn flint pebbles, which evidently came from the lower strata; in places this layer is very thick, showing the size of an ancient deposit, the washed out debris of which it represents. It lies at the base of the upper horizon of sands.

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[1] Gorodzov, V. A., "The Determination of Age and Several Peculiarities of Yenisey Palaeolithic," Northern Asia, Vol. I, Moscow, 1929.

[2] Ephimenko, P. P., "The Traces of Mousterian Cultures in Southern Russia," The Baghalei Memorial Volume, Kiev, 1927, pp. 286–301.

Little is preserved of this upper layer of sands in this section of the shore. The surface of the sands is uneven and mixed with the ground layer. It is dark in the upper part and is cemented by iron oxides. The cultural remains were found in the pebble layer between the two horizons of sands. Consequently we have the following section (Fig. 19A):

(*a*) Upper horizon of alluvial sands.
(*b*) Pebble layer with the cultural remains.
(*c*) Lower horizon of alluvial sands.
(*d*) Washed out marls.
(*e*) Chalk.[1]

The stratum C, contained large pieces of broken quartzite, quartzite flakes and implements made of flint and quartzite. That this part of the shore is continually underwashed by the action of the river, is evidenced by many pieces of quartzite found at the bottom of the steep bank. As a matter of fact, this action of the river has practically destroyed this valuable site. Consequently it appears that the river Derkula has dug a bed in the ancient (second or upper) terrace, the surface of which must have been far higher than its present level above the surface of the river.

It is very likely that the processes of deposition and subsequent washing out which took place, are closely connected with the approach and retreat of the glacier in the period of its greatest development. It is especially probable because the limit of the maximum glaciation lies not far to the north, in the Don River divide, near the source of the Derkula. Thus the upper sands are the remains of the lower (first) terrace, which here covers the upper (second) terrace, and which was formed during the last glacial epoch.

The Palaeolithic hunter left his tools on the surface of this ancient terrace, near the water, during the northward retreat of the maximum glaciation. Only one tubular bone of a large animal was found, which, because of its size, Ephimenko believes may belong to the Pachydermata (?).

Further investigations may disclose more of the faunal and cultural remains of this very interesting site, which is being rapidly destroyed by the river action. The investigations of Ephimenko in 1924–25, though preliminary, have resulted in very interesting material.

The Industry.—Most of the implements are made of clear gray, small grained quartzite, which is quite common in the Ukraine. Flint was not often used, perhaps because the flint pebbles found in abundance in the ancient river deposits are very small and there are no outcrops of good flint in the vicinity. The fact that the chips of quartzite show no evidence of water action, in contrast to the much worn flint pebbles, indicates, in the opinion of Ephimenko, that this material was brought here by man.

Besides the numerous flakes and chips, the following implements were found.

1. A large disc-like nucleus of typical Mousterian form. It is very flat, conical, 16.5 cm. in diameter and 5 cm. long, with a smooth lower surface, the upper one worked in broad

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[1] According to Malycheff, V. ("Le Loess," Review de Géographie physique, Paris, 1929–30, Vols. II, III, p. 273), the deposits of the Donetz valley, like those of Badrak, are contemporaneous with the lower strata of the younger loess, or at least with its upper strata.

triangles, joining at the apex. It is made of quartzite (quartzite verdâtre) [1] (Fig. 19*b*).

2. Several characteristic broad massive flakes of quartzite.
3. A typical scraper (*racloir*) 50 mm. long and 45 mm. wide at the base of the flake, made of the same material (Fig. 20, *b*).
4. Part of a wide blade with side retouch.

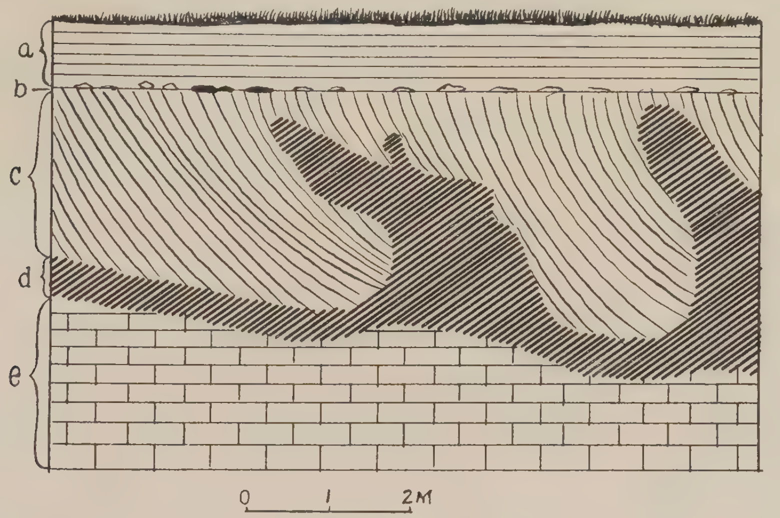
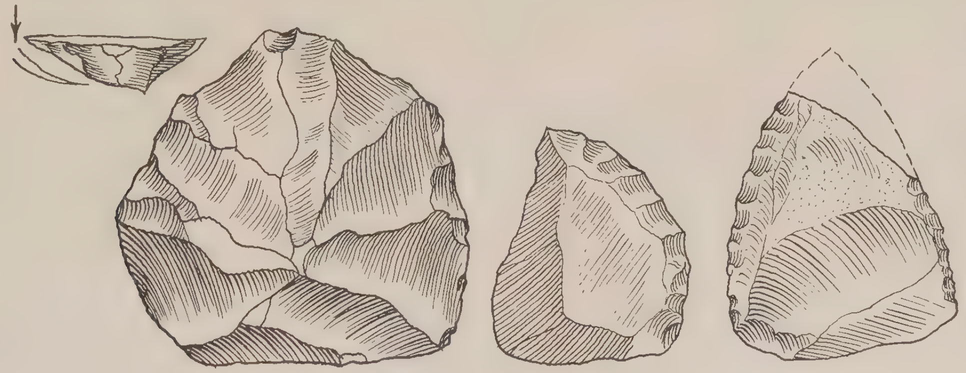


FIG. 19A. Section of the Terrace of the River Derkula. *a*, upper horizon of alluvial sands; *b*, pebbles with finds of Mousterian implements; *c*, lower horizon of alluvial sands; *d*, washed-out marl; *e*, chalk. After Ephimenko.



a *b* *c*

FIG. 19B. Discoidal nucleus, scraper and a point from Derkula. ½ Actual Size. After Ephimenko.

5. A fine point of Mousterian type, made of flint, unfortunately with one end broken (Fig. 20, *c*).

In spite of the small number of finished tools found, Ephimenko believes them to be sufficiently characteristic to classify Derkula as a Mousterian site. The workmanship and the size of the implements differ a great deal from those of other Mousterian sites of Russia, but are similar to the classical Mousterian of Western Europe.

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[1] Levallois, unstruck core (?). (E. G.)

10. Yashtukh Mountain

According to Field and Prostov,[1] Lower Paleolithic industry was found by Zamiatnin in 1934, in the vicinity of Yashtukh Mountain, near the town of Sukhum, of the Eastern shore of the Black Sea. (Fig. 20, no. 2.)

The site is located in the old alluvium of the third terrace of Gumnista River, on the road from Sukhum to Mikhailovka, 4 kls. north of the former, at the entrance to the gorge between the Byrts and Yashtukh Mountains.

Geology.—The cultural finds are in the stratum of the ancient alluvium of the Eastern Gumnista River. They were encountered "in the soil excavated from a ditch along the road, cutting across the ancient deposits; afterwards their place of origin was located in the gravel bed overlain by a stratum of dilluvial, argillaceous soil changing into the top soil. The gravel bed containing the stone implements has become, under the influence of the ferro-manganese combinations, a solid mass of conglomerate." [2]

Stone Industry.—The cultural finds occured sporadically, and did not form a cultural stratum. The following description of the artifacts is given by authors quoted above. "The majority are very massive, wide and short flakes of an irregularly triangular shape, with a very large striking platform occupying a considerable portion of the lower, flat side of the implement. The striking platform rarely displays preliminary flaking. In general the flints were utilised while still in this stage, without any further retouching, and have only a marginal fracture which may have been caused by usage. A number of discoidal nuclei were also collected."

Besides the nuclei, sharp-pointed implements, massive scrapers, several cleavers and discoidal implements worked on both sides are listed by the above authors. As the illustrations are not available, it is difficult to form any definite idea of this industry. It is being stressed that "comparatively few artifacts are worked by means of the Mousterian retouch" and that only "crude flaking characterizes the secondary working, which is typical of the *biface* implements of the Lower Palaeolithic Period."

Dating.—The geological observations of A. S. Soviev, collaborator of Zamiatnin, lead him to believe that these finds are "associated with the third terrace of the Eastern Gumnista River, connected in turn with the third terrace of the Sea." He feels that this site was occupied "during the Riss-Wurm interglacial period and it was denuded at the beginning of the Wurm period."

The "archaic" character of this industry, and the mixture of Clactonian and Levalloisian methods are rather puzzling. Zamiatnin is inclined to consider the finds from Yashtukh Mountain site, "the oldest Paleolithic implements yet discovered in the U. S. S. R."

11. Kiurdere

According to Field and Prostov,[3] the implements similar to the industry of Yashtokh of the Lower Paleolithic type were found by Zamiatnin at Kiurdere near Psyrtskhi (formerly Novii Afon) on the Black Sea. (Fig. 20, no 1). The stratigraphy was similar to that of the Yashtukh site. No illustrations are available.

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[1] Field, H., and Prostov, E., "Recent Archeological Investigations in the Soviet Union," American Anthropologist, Vol. 39, No. 2, pp. 268–269.

[2] Ibid.,

[3] Field, H., and Prostov, E., "Recent Archeological Investigations in the Soviet Union," American Anthropologist, Vol. 38, No. 2, pp. 268–269.

12. OCHEMCHIRI

According to Field and Prostov, Zamiatnin has found on the shore of the Black Sea near Ochemchiri, eighty kls. south of Sukhum (Fig. 20, no. 4), typical Mousterian implements in the similar stratigraphical position as the finds of Yashtukh, with this exception: that the artifacts "were found not in the gravel bed, but in the lower argillaceous level."

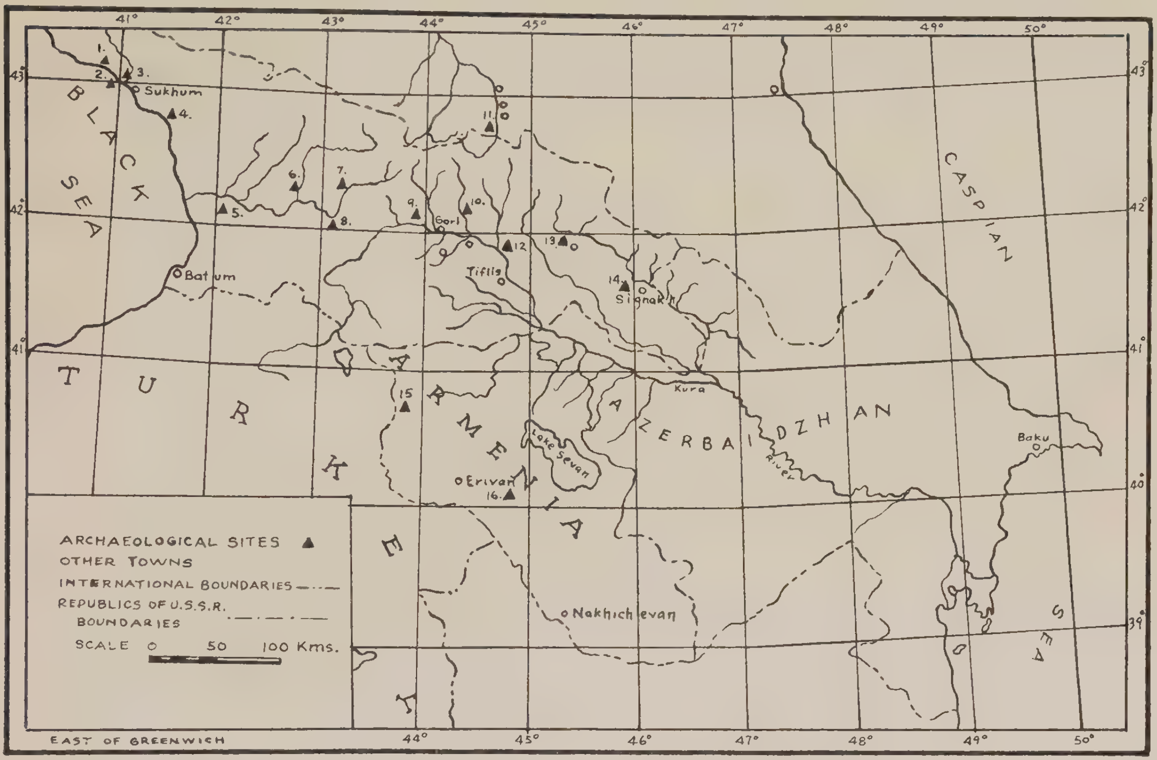
41° 42° 43° 44° 45° 46° 47° 48° 49° 50°
43° 42° 41° 40° 39°
Sukhum
BLACK SEA
Batum
Gori
Tiflis
Signakh
CASPIAN SEA
TURKEY
ARMENIA
AZERBAIDZHAN
Kura
Kura River
Lake Sevan
Erivan
Nakhichevan
Baku
1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12 13. 14. 15 16.
ARCHAEOLOGICAL SITES ▲
OTHER TOWNS
INTERNATIONAL BOUNDARIES
REPUBLICS OF U.S.S.R. BOUNDARIES
SCALE 0 50 100 Kms.
EAST OF GREENWICH

FIG. 20. Map of Archeological sites in Caucasus. *The Paleolithic Sites:* 1. Kiurdere; 2. Yashtukh Mountain; 4. Ochemchiri; 6. Virchov Cave; 7. Khergulis Klde; Taso Klde; Gvardzhilas Klde; Mgrimevi; Tsizkhvali; Chiaturi. After Field & Prostov.

13. SHAITAN-KOBA (BADRAK)

Location.—The rock-shelter of Shaitan-Koba was discovered in 1928 by S. N. Bibikov. It is situated in the valley of the river Badrak, 12 kl. southwest of Siempheropol, Crimea. It lies on the eastern slope of the second chain of Crimean mountains, at the base of the limestone formations, 20 mtr. above the river level and 170 mtr. above sea level.

The rock-shelter is semi-oval in form, faces southwest, and is 4 mtr. wide, 7 mtr. in its maximum depth and 2 mtr. high (Plate XVII, *a*, *b*, *c*).

The trial pit, 1 sq. mtr., has revealed a flint industry of "typical Mousterian type," made up largely of points and side scrapers. About twenty specimens were found, made from wide flakes, a few long, massive flakes and a large nucleus.

In 1929 G. A. Bonch-Osmolovsky,[1] leading the Crimean Expedition of the State

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[1] Bonch-Osmolovsky, G. A., "The Shaitan-Koba, Crimean Site of the Abri-Audi Type," Bulletin of the Quaternary Committee, No. 2, 1930, p. 65.

Zoological Museum of the Russian Academy of Sciences, made systematic excavations of the rock-shelter of Shaitan-Koba proper (25 sq. mtr.) and of the slope leading to the bottom of the valley, where only a large trench was made (Fig. 21, I, II, III).

According to the author the excavations revealed the following conditions:

Geology.—The cultural level of Shaitan-Koba must have been much thicker at one time because cultural remains in the lime deposits near the walls of the cave reach a considerable height.[1] However, sometime during the Middle Ages, when the nearby settlement of Bakla was founded, the half filled rock-shelter of Shaitan-Koba was partly cleared of the cultural debris. The cave was apparently used by the inhabitants for domestic purposes, as it is clearly seen from the hitching ring worked in the rock below the ancient cultural layer. Only a comparatively thin layer of undisturbed cultural deposit, about 30 cm. in thickness, was left. The cultural remains in the trench along the slope testify to the clearing (Fig. 21).

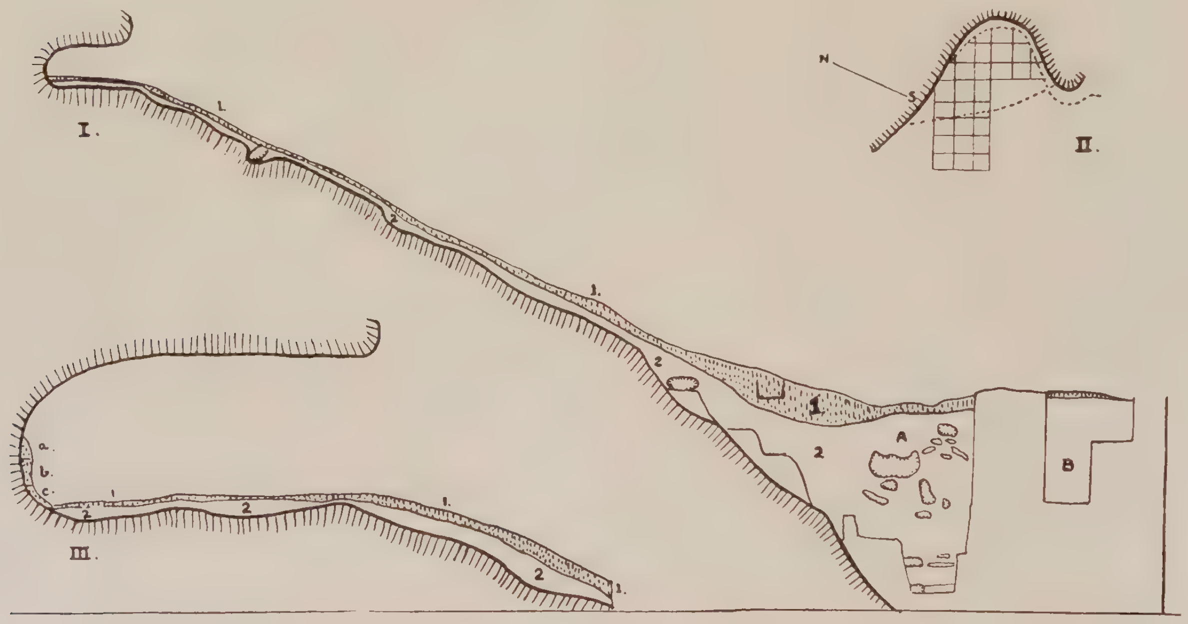

FIG. 21. ROCK SHELTER, SHAITAN-KOBA. I, General Profile of the Rock Shelter and the Slope; II, Ground Plan of the Rock Shelter; III, Detailed Profile of the Rock Shelter. *A*, Scythian Burial; *B*, Trial Pit. *A*, upper cultural layer; *b*, intermediate layer; *c*, lower cultural layer. After Bonch-Osmolovsky.

From the few remains found in the lime deposit along the walls, one gets the impression that we are dealing with two separate cultural horizons, but, according to the author, the scarcity of material does not permit any such classification, and he deals with all finds of Shaitan-Koba as belonging to one level.[2]

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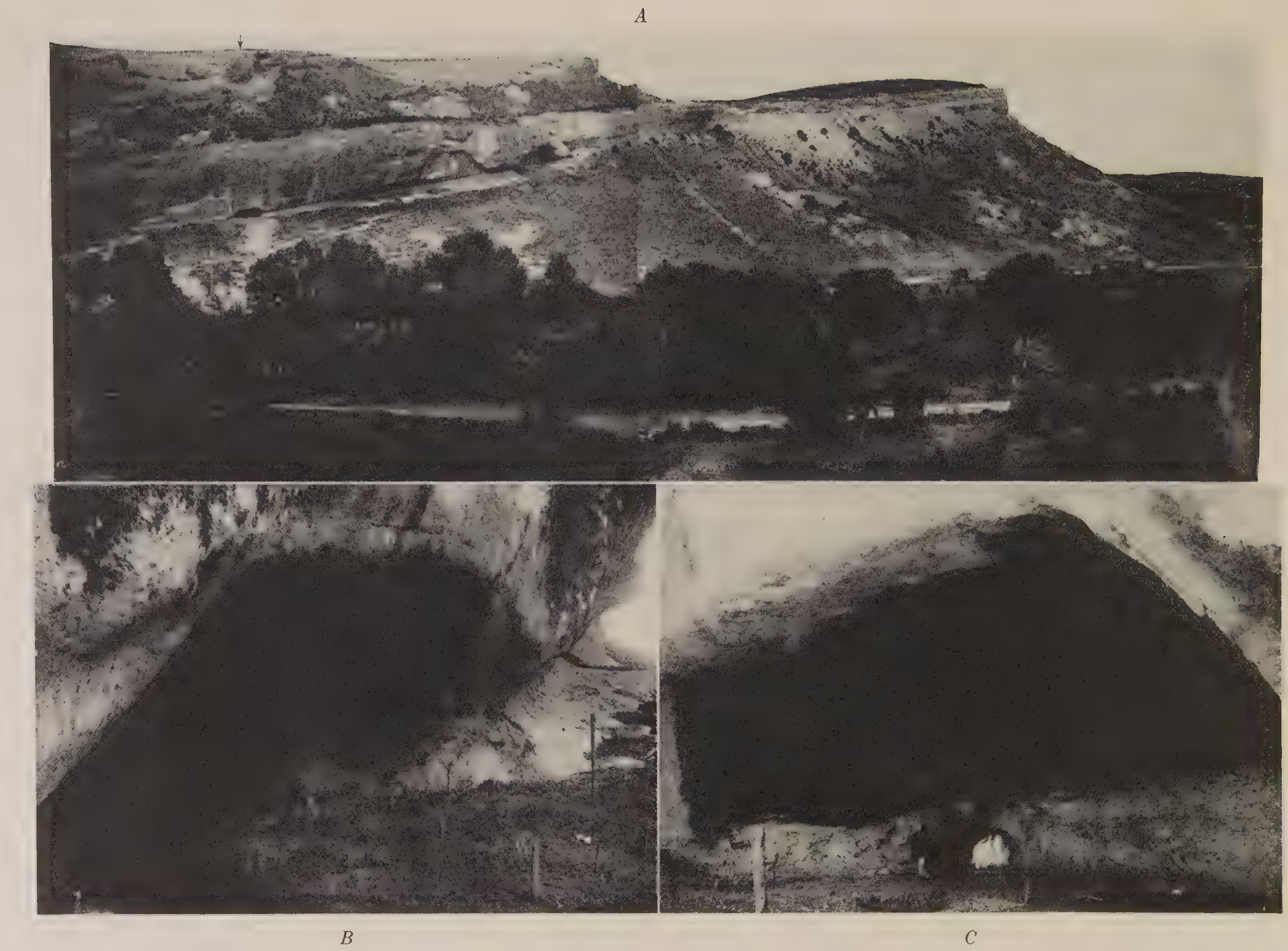
[1] According to Vera Malycheff (Le Loess, "Review de Géographie physique," Paris, 1929–30, Vols. II, III). "La formation des couches de l'abri de Badrak pourrait correspondre a la mise en place du niveau inferieur du complexe loessique récent."

[2] This fact should be borne in mind at all times in determining the place of Shaitan-Koba in the scale of stone industries, as the material from the trench may very well belong to the second horizon, if the latter existed. (E. G.)

PLATE XVII.



A

B

C

A. General View of Rock-Shelter, Shaitan-Koba. *B*, *C*. Entrance into the Caves. Photos after Bonch-Osmolovsky.

Fauna.—According to Gromov:[1]

Elephas primigenius,
Equus caballus,
Equus asinus,
Sus scrofa ferus,
Saiga tatarica,
Canis lupus,
Vulpes vulpes,
Vulpes lagopus,
Felis leo,
Hyaena spelaea,
Cricetus (Cricetulus) migratorius,
Mus sylvaticus,
Arvicola amphibius,
Lagurus luteus,
Alactaga jaculus.

In the cave proper there was a very thin modern level of ashes, with occasional flint chips at the top. Between it and the rocky bottom of the cave was an undisturbed Quaternary layer, yellow, and, in spots, grey-green in color. It is in the upper part of this level that most of the finds of flints and charred bones were made. About 10 cm. below the surface was a thin layer of dark ashes and charred bone (hearth). The author is certain that the cultural deposit in the cave was undisturbed, as he found many very fragile unbroken hyena coprolites. He also states that neither in the material found in the lime deposits adhering to the walls, nor in the trench below, was anything found which was not present in the main "undisturbed deposit" of the cave proper. Consequently, the following observations are related to the finds of the cave deposit, but apply to the site as a whole.

Industry.—Most of the tools found were made out of dark, almost black flint of a very good quality, quite similar to that found now only 2 kl. from the cave, where pieces weighing up to 20 kilogrammes are encountered on the surface.

Nuclei (Fig. 22, nos. 1–3).—There is evidence of the abundance of good material, as, out of a total of 650 objects, about 150 nuclei varying from 5–13 cm. in length were found. The nuclei are for the most part discoidal in shape, worked on one side, the other preserving the original surface. According to the investigator, "this surface is preserved usually only in the middle of the lower side. Around the edges there are always the small facets resulting from the improving of the striking platform, thus assuring a more precise blow."[2] Only a few nuclei were worked on both sides. The other types of nuclei are either prismoidal, elongated, or cube-shaped, with the parallel ridges formed by the longer flakes. The striking platform is usually on the acute angle. The cube-shaped nuclei form the exception with the striking platform on the right angle, bearing the traces of faceting.

Flakes.—Flakes and blades are about equal in proportion. The latter are unusually fine and regular. The blades are hardly distinguishable from the Upper Paleolithic ones, except for the faceting of the striking platform and their width and massiveness. They form about 15 per cent. of the industry (Fig. 22, no. 4).[3] About 10 per cent. of the tools are prepared on the long flakes which preserve the original surface of the nucleus on one side. The presence of *eclat primitif*[4] and the long flakes (Fig. 22, no. 4), in the opinion of Bonch-Osmolovsky, takes Shaitan-Koba out of the pure Mousterian class, and gives its industry a transitional relation to the upper Paleolithic, corresponding to that of the Abri Audi in Europe.

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[1] Gromov, V. I., "Geology and Fauna of the Palaeolithic Period in U.S.S.R.," Problems of the History of Material Culture, Nos. 1–2, 1933, pp. 23–33.

[2] Bonch-Osmolovsky, G. A., "The Shaitan-Koba, Crimean Site of the Abri-Audi Type," Bulletin of the Quaternary Committee, No. 2, 1930, p. 65.

[3] Really a very wide and thin flake. (E. G.)

[4] Which in itself is not a reason. (A. Kelley.)

Bifaces, according to Bonch-Osmolovsky, are the most archaic forms and are as rare as in Abri Audi. Out of 500 tools, only 14 had traces of bifacial work, and, of this number, only 6 can be considered as finished tools. Such are 2 examples of hand-axes. The first (Fig. 22, no. 5) is 14 cm. long, 8.5 cm. wide and 4 cm. thick, made out of a large flat flint nodule, very roughly chipped on both sides, but preserving the original surface of the block, which "as result of the long use is much rubbed and striated." [1] It has very little in the way of the secondary retouch. In its archaic form and technique of making, it is nearer to the typical Chellean (Acheulean?) *coup de poing*.

The second biface (Fig. 23, no. 6) is a regular almond shaped tool (9.5 cm. lòng, 5.7 cm. wide and 1.5 cm. thick.) of unusually fine workmanship, being flaked by skillful blows from the periphery. The straight working edge is finely retouched, the opposite edge backed for the hand. There are five other tools with bifacial techniques, reminding one of scraper-like hand axes, of small size. The rest of the nuclei, with traces of use or improvement, are unfinished and appear accidental in character.

Scrapers.—About fifty per cent. of all the tools are "typical Mousterian side-scrapers," half of them made on flakes, half on very thin blades. The majority of them are single scrapers with little retouch on the working edge (Fig. 23, no. 4). Some have retouch on both ends (Fig. 23, nos. 1, 5); a few have a convex edge and coche (Fig. 23, no. 3).

Points.—Next in importance are the points, mostly made on blades (Fig. 25). There are a few asymmetrical points with one straight and another curved edge, the latter usually being steeply retouched (Fig. 25, nos. 1, 3, 4).

About 25 per cent. of all the tools are made on long flakes and primitive blades (Fig. 25, nos. 6, 7). Bonch-Osmolovsky also mentions the points and asymmetrical points of the type of Abri-Audi, eight in number, and, according to him, quite typical (Fig. 24, no. 2; Fig. 25, no. 3).

The investigator stresses the presence of tools of the Upper Palaeolithic type, such as the prototype of a scraper of high form (Fig. 24, no. 7), the scraper-like tools made on the flakes and blades (Fig. 24, nos. 5, 6), the tool which he considers either an end scraper or a nuclei-form graver (Fig. 24, no. 3), the scrapers on the end of a blade with a straight working edge (Fig. 24, no. 6), and perforators made of flakes with a fine point formed by an alternating retouch (Fig. 23, no. 2*a*, *b*).

Gravers.—Among the number of gravers which are not so well made, and do not have a typical appearance, there are found, however, some ten specimens of very definite form. Such are a middle graver on a nucleus (Fig. 26, no. 1), the same on an original flake (Fig. 26, no. 2), an angle graver (Fig. 26, no. 3) and graver flakes (Fig. 26, no. 4).

There are cases of vivifaction [2] of points with *burin* strokes. Such are the points represented on Fig. 26, nos. 5 and 6.[3]

Bone Industry.—No bone implements were found in Shaitan-Koba. Many fragments of bone with traces of use as anvils or retouchers were found, however, some with traces of

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[1] Bonch-Osmolovsky, G. A., "The Shaitan-Koba, Crimean Site of the Abri-Audi Type," Bulletin of the Quaternary Committee, No. 2, 1930, p. 65.

[2] The term used to indicate additional work done on a dulled or broken point to produce a new working edge. (E. G.)

[3] In the case of No. 6, the blow may be for the reduction of the bulb. (E. G.)

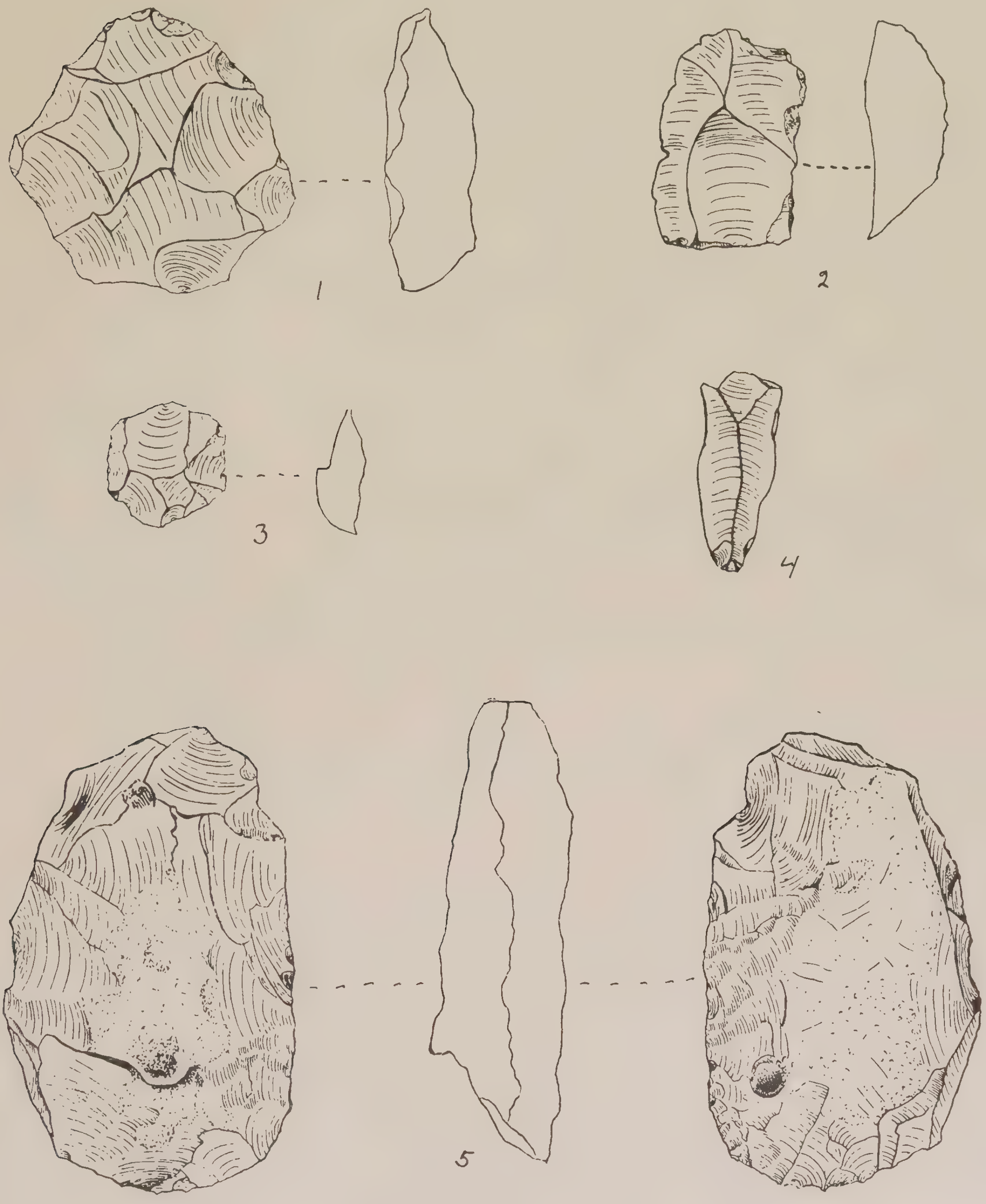

Fig. 22. Flint Industry of Shaitan-Koba. After Bonch-Osmolovsky.

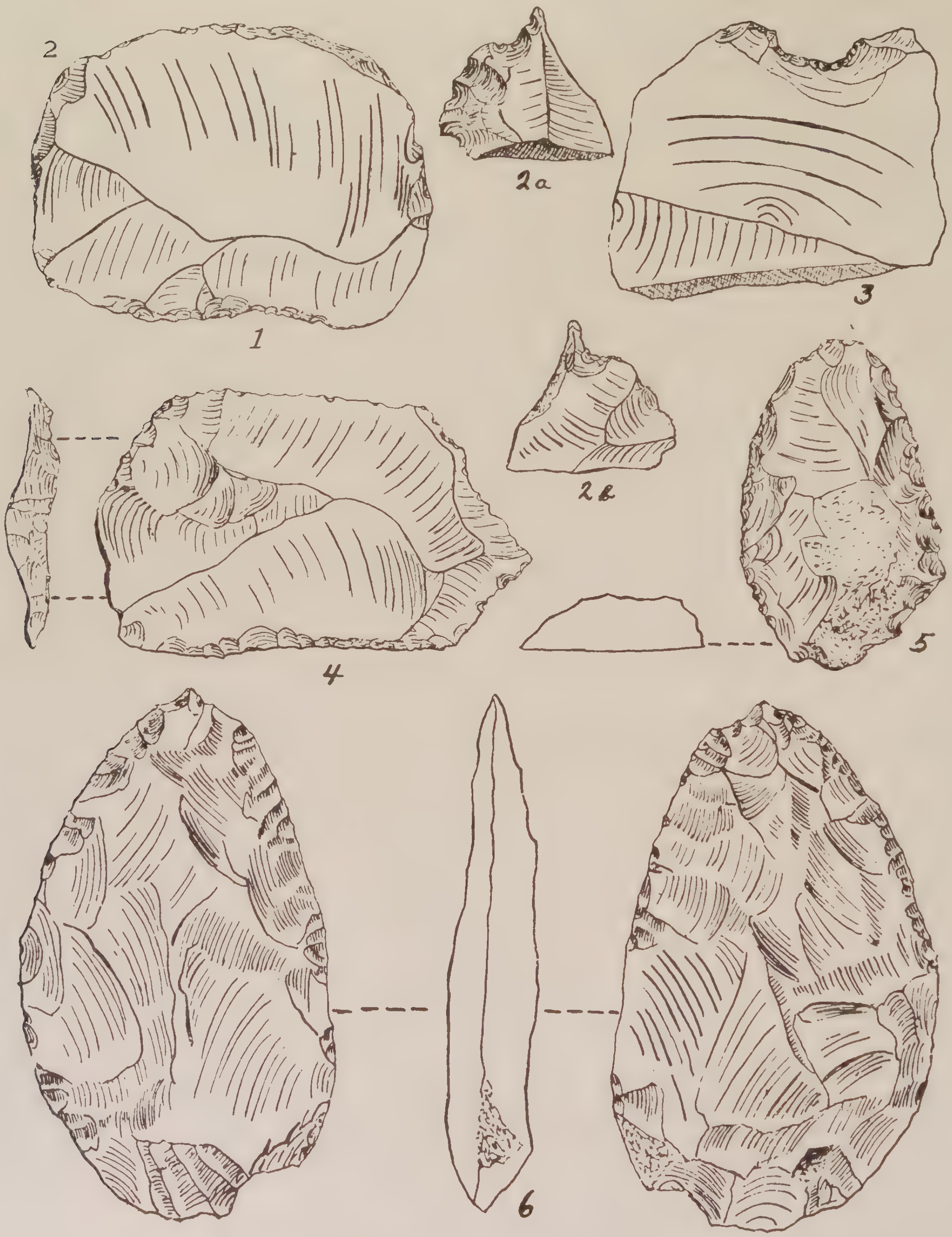

Fig. 23. Flint Industry of Shaitan-Koba. After Bonch-Osmolovsky.

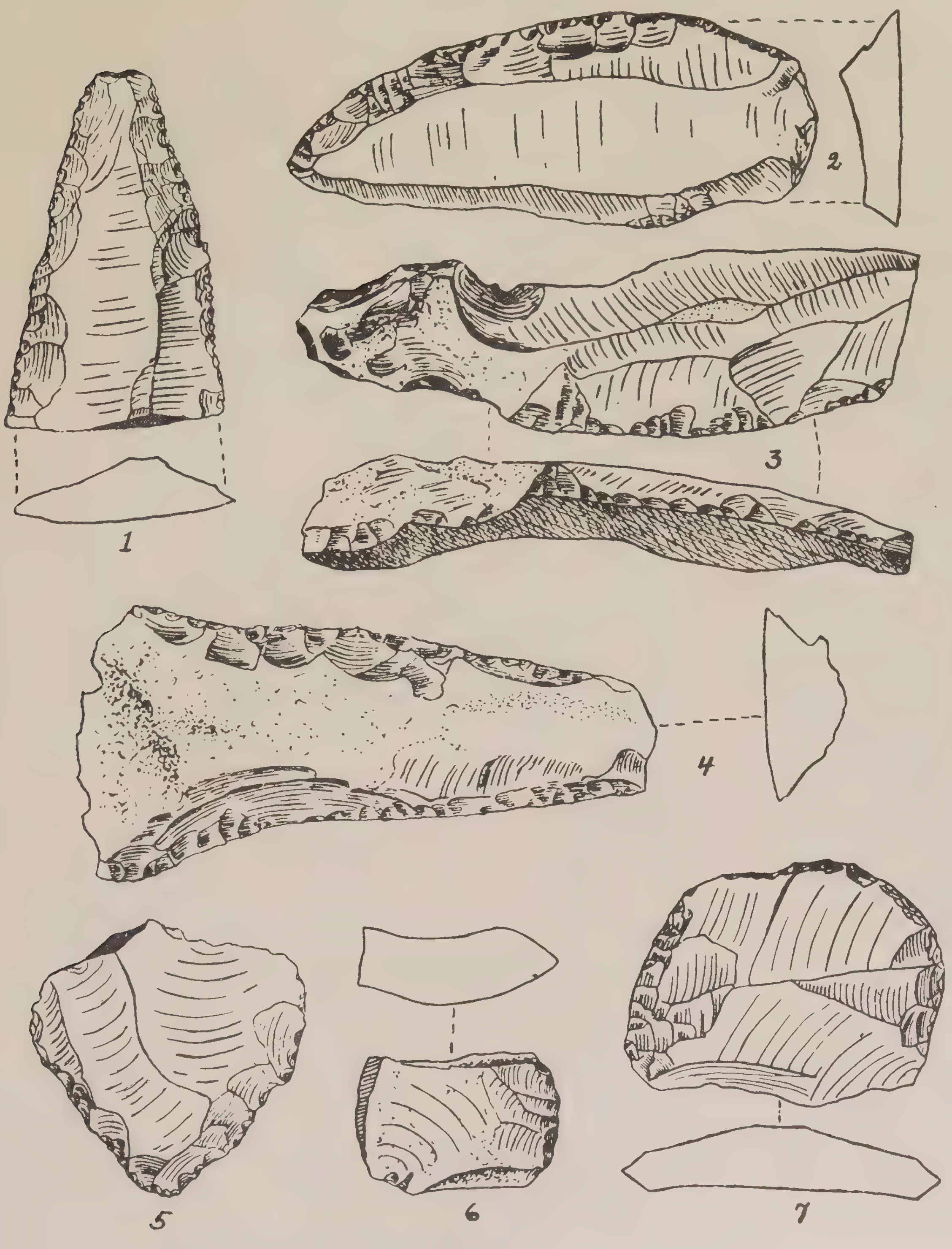

FIG. 24. Flint Industry of Shaitan-Koba. After Bonch-Osmolovsky.

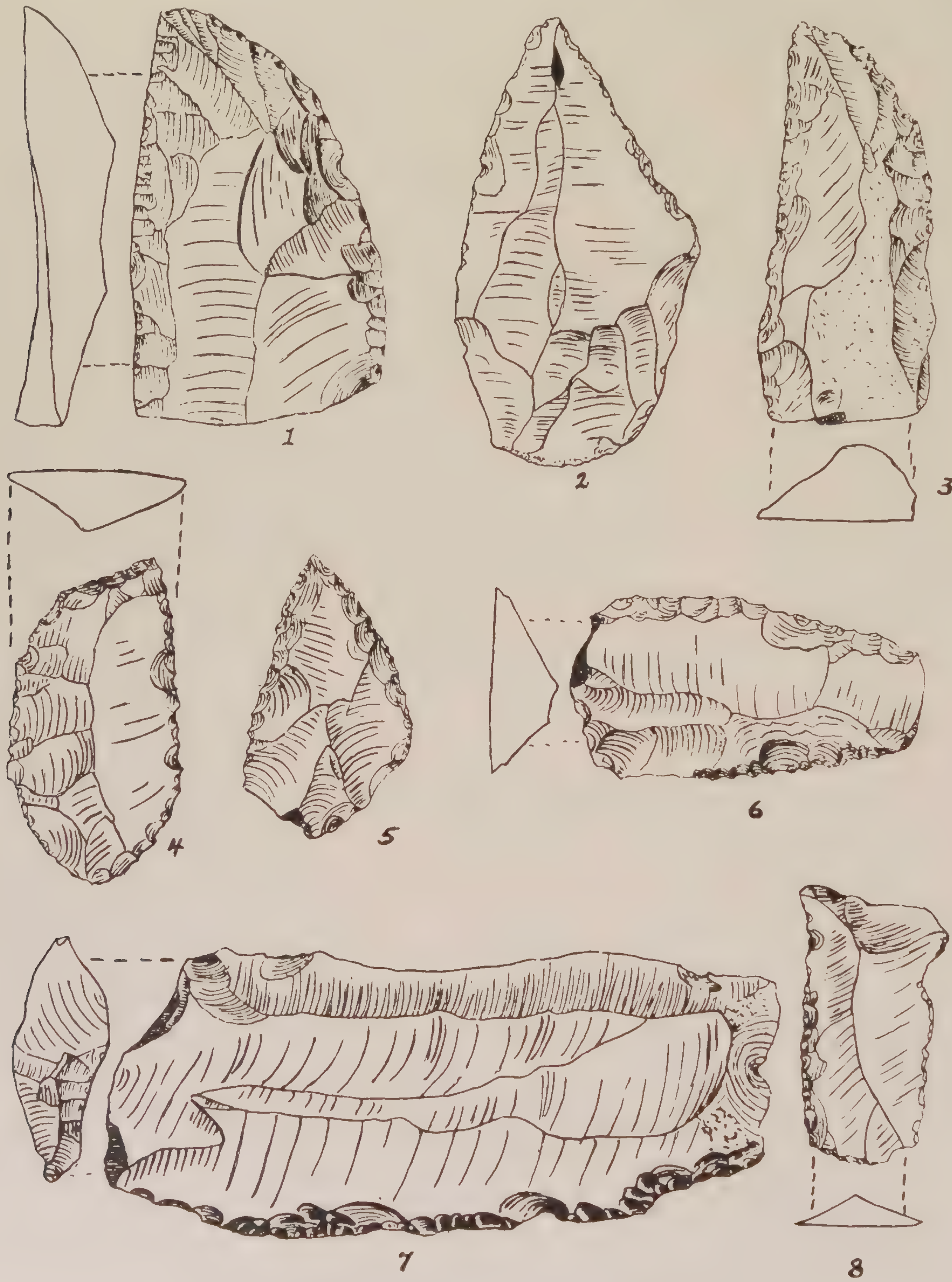

FIG. 25. Flint Industry of Shaitan-Koba. After Bonch-Osmolovsky.

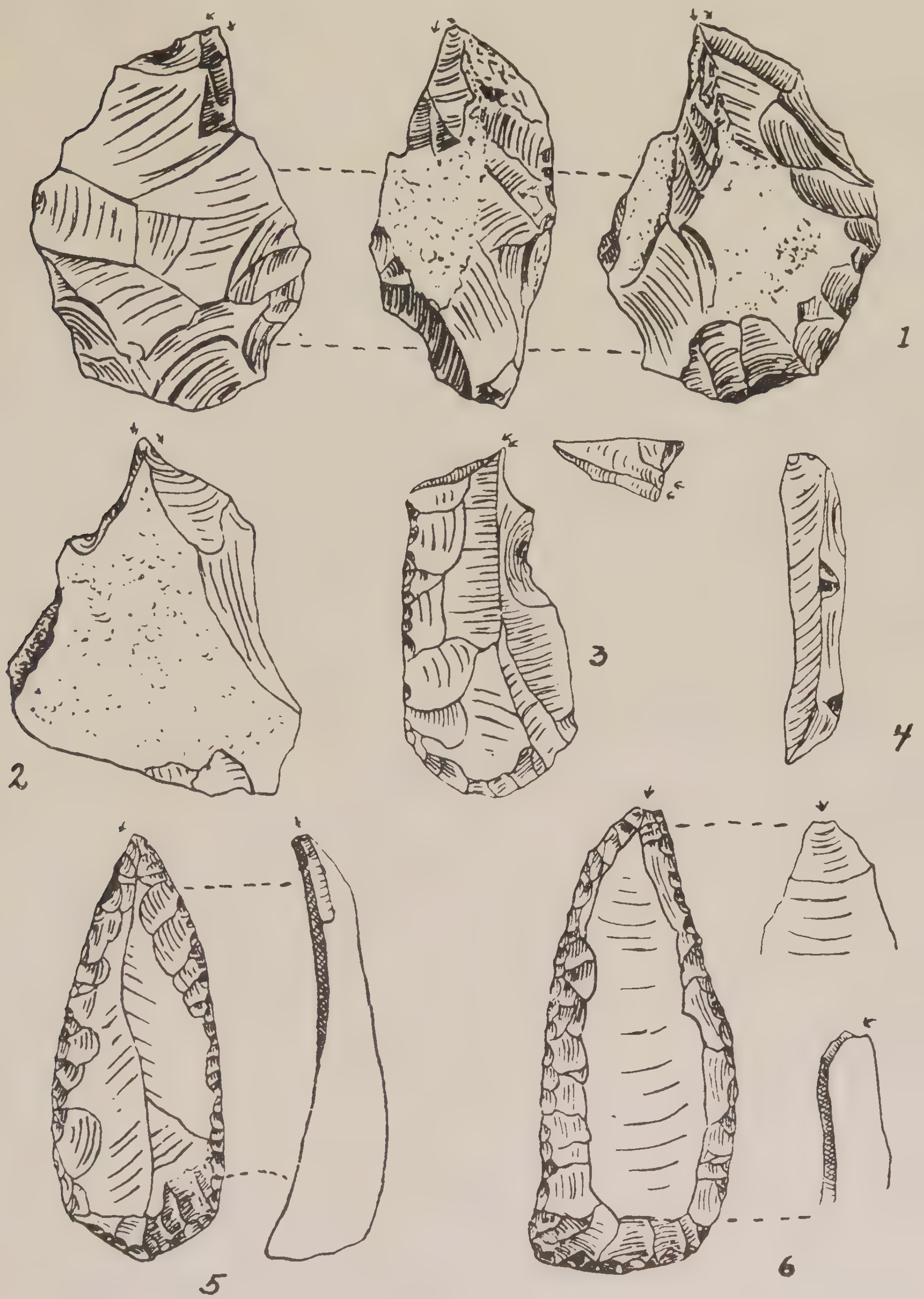

Fig. 26. Flint Industry of Shaitan-Koba. After Bonch-Osmolovsky.

smoothing, some with typical ligament cuts, etc. In general the bone material is quite similar to that found in Chokurcha cave (see pages 259–265) and Kiik-Koba (see pages 240–258).

Dating.—The analogy to Abri-Audi, which Bonch-Osmolovsky finds both in the finished implements, and in the unworked flakes and blades (the secondary material) of Shaitan Koba, places it in between the late Mousterian and early Aurignacian. The excavator is inclined to consider Shaitan-Koba slightly older on the basis of the larger predominance of typical Mousterian flakes and methods. He feels that the presence of *burins,* as well as the large use of long flakes and blades, makes it a link between the Mousterian and Upper Palaeolithic industries, and, as such, it is of very great importance.

The geology of the site does not give any clue, although, in the future, it may be possible to tie it in with the river deposits of Badrak. The fauna itself, according to Bonch-Osmolovsky, is slightly older than that of Suren (the Aurignacian site).

Up to now, Shaitan-Koba is the only site in Eastern Europe which presents the characteristics of transition between the Lower and Upper Palaeolithic industries, and in this lies its importance.[1]

It was suggested by Mrs. Alice Kelley that Shaitan-Koba, except for the presence of the *burins* is very much like La Quina, though somewhat older.

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[1] One should not forget in following the argument of Bonch-Osmolovsky that we may still be dealing with two horizons and that his layer in the cave was disturbed or mixed. To quote the author in reference to the find in the lime deposit on the walls: "They are all either thin Mousterian blades or primitive blades and as a whole produce a somewhat more perfect impression than the finds in the basic (cave layer) culture." This is especially important because, according to his table, there is an intermediate sterile layer between the two layers of concretions. (See Fig. 21). Can it be that we are really dealing here with two horizons, one Mousterian and the other Aurignacian? (E. G.)

D. UPPER PALAEOLITHIC SITES OF EUROPEAN RUSSIA

SUREN I

The cave of Suren I is located near the village of Biuk-Suren of the Bahchisarai region, off the highway between Bahchisarai and Yalta in Crimea. It is in the valley of the Belbek River, 12 km. southwest of Bahchisarai, and was discovered in 1897 by K. S. Merezhkovsky.[1] Later excavations were made by G. A. Bonch-Osmolovsky and N. L. Ernst in 1926–29.

Suren I is a very large, typical rock-shelter, situated 110 m. above the sea level and 25 m. above the floor of the valley, in the second chain of the Crimean mountains, on the eastern slope of the Belbek canyon. Its formation is the result of weathering (Plate XVIII).

The excavations of Merezhkovsky resulted in the discovery of the following stratigraphy:

1. A layer of decayed excrement.
2. A white layer 75 cm. thick of limestone debris fallen from the ceiling.
3. A gray layer of the same with admixture of clay. In the lower part of this layer were two thin "hearth" layers, where flint tools, small fragments of bone and charcoal were found.

The list of fauna remains given by Merezhkovsky include: *Saiga tatarica*, *Bos* sp., *Sus* sp., *Cervus elaphus*, *Canis* sp. (?).

The flint industry found by Merezhkovsky in the two horizons [2] belongs, according to G. A. Bonch-Osmolovsky, to Aurignacian and Magdalenian, respectively. It includes a group of nuclei-like forms, very characteristic of Early Aurignacian, such as nuclei-like and *rabot* type scrapers and a series of high nuclei-like gravers. There are also a number of usual Upper Palaeolithic forms made of long flakes, scrapers, gravers (usually multifaceted), blades with dulled back, and large Aurignacian blades with a round retouch.

According to P. P. Ephimenko,[3] there were also found simple bone tools, appearing for the first time in the Aurignacian. He feels that both horizons contained a more or less similar industry.[4] This is perhaps due to the incompleteness of the account.

The excavations of Bonch-Osmolovsky, in 1926 and subsequent years, have resulted in a fuller, though somewhat different picture. He finds the following stratigraphy.[5]

1. A black sterile layer of decomposed excrement and ashes 5.20 cm.
2. Next a layer 6 cm. in thickness formed of slabs of limestone fallen from above, sometimes very large, with three Palaeolithic layers situated at different depths. In some spots, owing perhaps to the water action, the space between the stones was filled with dark clay or with a mixture of lime and sand, whitish grey in color.
3. Below this, and extending 9 cm., almost down to the floor of the cave, is a sterile layer of detritus of fine limestone, rolled with humid brown clay.

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[1] Merezhkovsky, K. S., "The Report of the Preliminary Investigations of the Stone Age in Crimea," Izvestia of Imperial Russian Geographical Society, Vol. XVI, pp. 106–142, 1880; Vol. XVII, pp. 104–115, 1881.

[2] Bonch-Osmolovsky, G. A., "The Prehistoric Cultures of Crimea," "Krim," No. 2.

[3] P. P. Ephimenko, "Some Results of the Study of Palaeolithic Period in U.S.S.R.," "Chelovek," No. 1, 1928, Leningrad, p. 51.

[4] *Ibid.*

[5] Bonch-Osmolovsky, G. A., "Le Paléolithique de Crimée," Bulletin de la Commission pour l'Étude du Quaternaire, No. 1, 1929, pp. 27–34.

The formation of this layer is best explained by the action of water flowing on the bottom of the cave and destroying the lower layers of stone.[1]

All three layers yielded flint tools, bone objects, animal bones, Quaternary fishes, and small pieces of charcoal.

The lower cultural horizon extended over almost the entire surface and yielded most of the finds. The middle horizon covered only part of the area, while the upper horizon is represented by small deposits vaguely indicated and with a depth of 0.5–1.5 meters.

Fauna and Flora.—Gromov [2] gives the following list of mammals:

	Lower Horizon (Layer IV)	Middle Horizon (Layer III)	Upper Horizon (Layer II)
Elephas primigenius	×	—	—
Equus caballus	×	×	×
Sus scrofa	×	—	×
Bos sp.	×	×	×
Cervus elaphus	×	×	×
Cervus megaceros	×	×	×
Rangifer tarandus	×	—	—
Saiga tatarica	×	×	×
Canis lupus	×	×	×
Vulpes vulpes	×	×	×
Vulpes lagopus	×	×	×
Vulpes corsac	× (sp.)	× (sp.)	×
Putorius evesmanni	×	—	—
Putorius ermineus	×	×	—
Putorius nivalis	×	—	×
Ursus arctos	—	—	×
Ursus spelaeus	×	—	—
Hyaena spelaea	×	—	—
Lepus timidus	×	×	×
Ochotona pusilla	×	×	×
Marmota bobac	×	×	×
Citellus rufescens	×	×	×
Castor fiber	×	—	—
Cricetus cricetus	×	×	×
Cricetus (*Mesocricetus eversmanni*)	×	×	×
Cricetus (*Cricetulus*)	×	×	×
Mus sylvaticus	×	×	×
Arvicola amphibius	×	×	×
Microtus arvalis	×	×	×
Evotomys glareolus	×	×	×
Lagurus luteus	×	×	×
Ellobius talpinus	×	×	×
Alactaga jaculus	×	×	×
Alactaga elater	×	×	×
Scirtopoda telum	×	×	×

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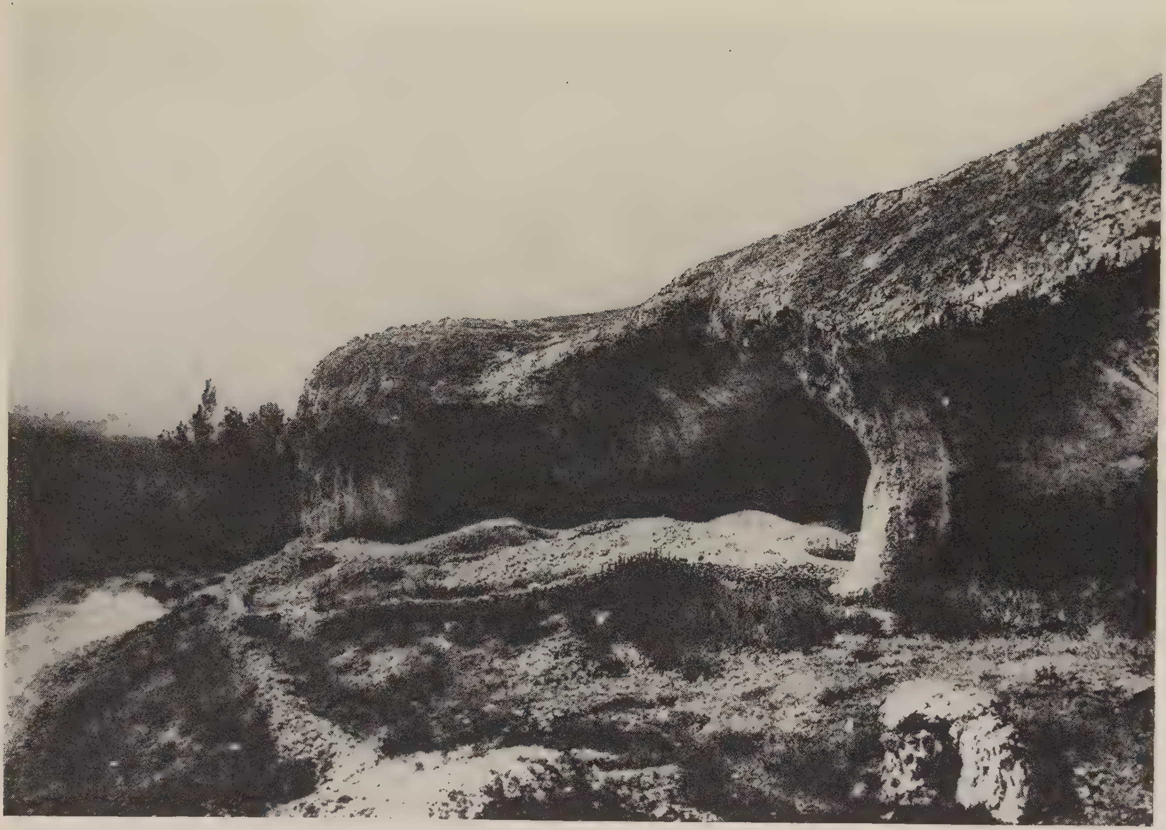
[1] According to Malycheff, Vera ("Le Loess," Revue de Géographie physique et de Géologie dynamique, 1929–30, Vols. II and III, pp. 272), the formation of the layers of Suren I "est contemporaine en partie tout au moins de la mise en place du niveau loessique supérieur qui, en effet, a fourni de l'Aurignacien, tout comme les couches de l'abri."

[2] Gromov, V. I., "Geology and Fauna of the Palaeolithic Period in U.S.S.R.," Problems of the History of Material Culture, Nos. 1–2, Leningrad, 1933.



General View of Cave Suren I, Crimea. After photo of Bonch-Osmolovsky.

M. Tichii[1] studied the fish bones, and identified the following:

	Lower Horizon (Layer IV)	Middle Horizon (Layer III)	Upper Horizon (Layer II)
Salmo sp.	×	—	×
Salmo trutta laborax	×	—	×
Rutilus frisii	—	—	×
Leuciscus cephalus	—	—	×

A. Hammermann[2] identifies the flora by the study of charcoal and ashes of Suren I: (Fig. 27.)

	Lower Horizon (Layer IV)	Middle Horizon (Layer III)	Upper Horizon (Layer II)
Sorbus aucuparia	×	—	—
Populus tremula (?)	×	×	×
Rhamnus cathartica	×	—	—
Betula sp.	×	×	×
Salix sp.	×	—	—
Juniperus sp.	×	—	×
Taxus baccata (?)	×	—	—

Industry.[3]—The industries of all three horizons are of the Aurignacian Age. The fundamental type is rough, consisting of prismatic flakes characteristic of this stage. The differences permit us further to date the horizons.

In the lower horizon one finds:

1. Mousterian forms—not numerous.
2. Large flakes with lateral retouch.
3. Nuclei-like scrapers with round edge.
4. Scrapers on the end of blade.
5. Gravers (*burin droits*), angle and multifaceted (few).
6. Small blades with alternative or side retouch.

Those forms definitely indicate lower Aurignacian industry.

In the middle horizon the Mousterian forms almost entirely disappear, the nuclei-like scrapers acquire the contour of "*grattoirs caréné*," while gravers, which increase in quantity, approach the form of the "*burin busqué special*," and finally the small blades almost disappear.

In the upper horizon the industry has a more definite character. Besides a large number of multi-faceted gravers, among which the most massive can be classified as nuclei-like,

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[1] Tichii, M., "Fische aus dem Paläolithikum der Krim," Bulletin of the Quaternary Committee, Vol. 1, 1929, pp. 43–46.

[2] Hammermann, A., "Kohlenreste aus dem Paläolithikum der Krim, Höhlen Ssjuren I und II," Bulletin de la Commission pour l'Étude du Quaternaire, No. 1, pp. 39–42.

[3] Unfortunately Bonch-Osmolovsky does not give any illustration or detailed description of the industry.

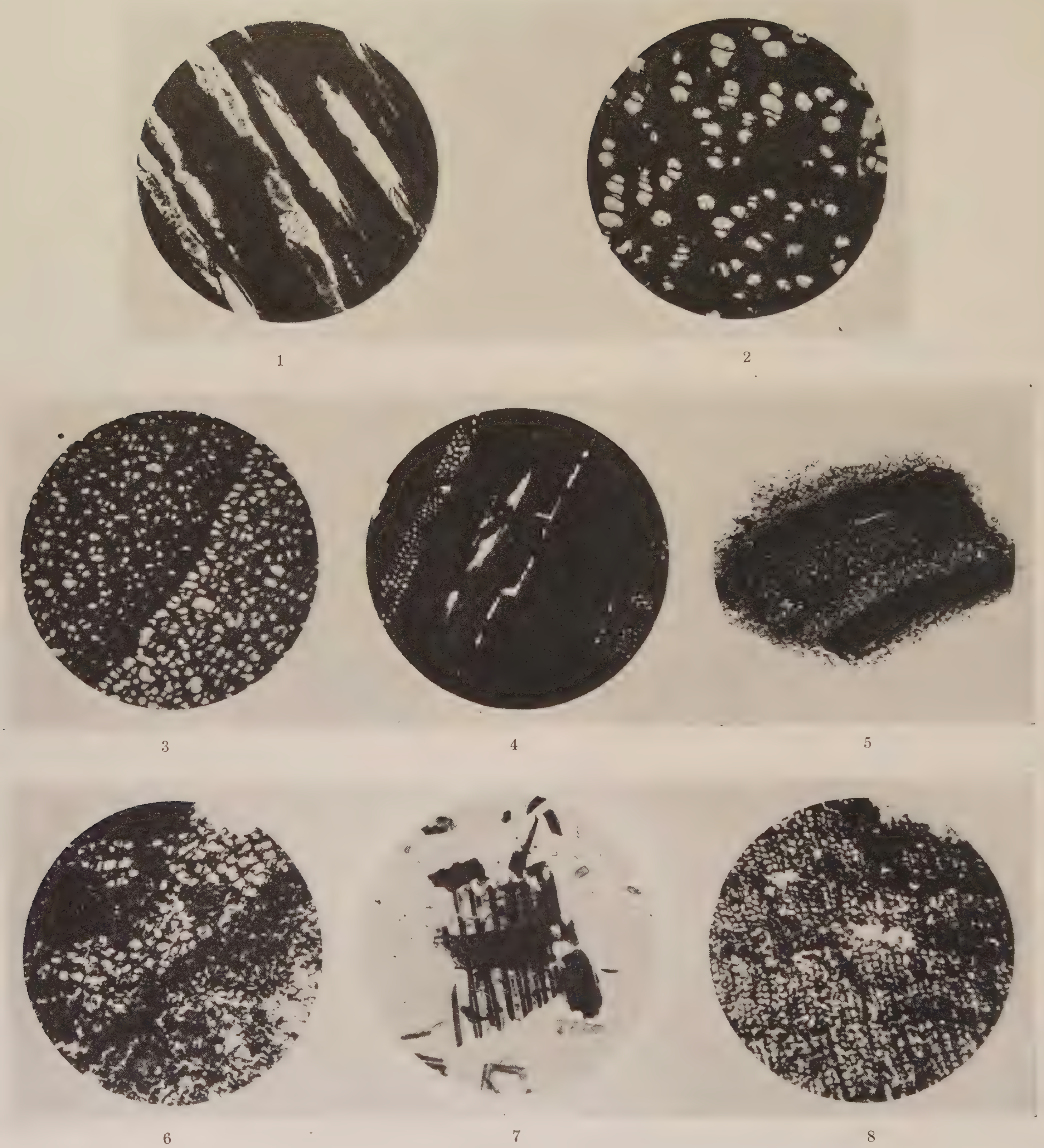

FIG. 27. Flora from Suren I. After Hammermann.

1. *Betula* sp. Längsschnitt. Kohle aus Ssjuren I. 2. *Betula* sp. Querschnitt. Kohle aus Ssjuren I. 3. *Populus* sp. Querschnitt. Kohle aus Ssjuren I. 4. *Populus* sp. Längsschnitt. Kohle aus Ssjuren I. 5. *Sorbus aucuparia.* Querschnitt. Kohle aus Ssjuren I. 6. *Rhamnus cathartica.* Querschnitt. Kohle aus Ssjuren I. 7. *Juniperus* sp. Abschabepräparat. Kohle aus Ssjuren I. 8. *Juniperus* sp. Querschnitt. Kohle aus Ssjuren I.

the presence of several points similar to La Gravette permits us to assign it, without a doubt, to Upper Aurignacian.

An interesting fact is the appearance here of small blades in large quantities, but these are exceedingly blunt on the edges.

The bone industry of all three horizons is less typical. Most of the objects have the appearance of points (*poinçons*) and one from the lower horizon can, perhaps, be regarded as an Aurignacian point with a slight notch feebly marked on the end. No objects of art except an ornamented fragment of horn were discovered.

Bonch-Osmolovsky considers the industry analogous to the corresponding industries of Western Europe, not only in regard to similarity of various types of implements, but also in the general complexity of the layers.

2. Devis–Hvreli

This cave is situated in the district of Sharopan, Kutais region, Caucasus, half way between the railroad stations of Charaguli and Dziròla, 4 km. from the quarries of Chandebi, on the slope of Chandebi mountains.

It is of crystalline limestone formation, lies 340 m. above the sea level, and some 80 m. above the level of the river Chkherimèlla. The cave was discovered in 1926 and investigated by Prof. George Nioradze,[1] assisted by students, during the years 1926–32. The material from his excavations was displayed in 1932 at the International Archaeological Congress in Leningrad and is now preserved in the State Georgian Museum in Tiflis. The geology of the site was studied by A. Sorokin, S. Semenov and P. Gamkrelidze.

According to Nioradze, the cave is 25 m. long, with a width at the entrance of 4.5 m. to 6.5 m., opening to the sourth-west (Fig. 28).

Geology

The excavations revealed the following stratigraphy:

I. Humus and animal bones, dark in color.
II. Brown layer, likewise with animal bones.
III. Cultural layer.
IV. Rocky Bottom.

Fauna.—Remains of the following fauna were found in the cultural level in association with the stone artifacts:

1. *Sus scrofa ferus*,
2. *Bos primigenius*,
3. *Bison priscus*,
4. *Cervus elapus* aff. maral,
5. *Rangifer tarandus*,
6. *Capra* sp. (*Capra cylindricornis?*),
7. *Rupicapra tragus*,
8. *Capreolus* sp.,
9. *Ursus spelaeus*,
10. *Ursus arctos*,
11. *Mesocricetis kownigi*.

In general, according to Nioradze, the fauna is like that of more recent times, (?) although somewhat richer in species.

Human Remains.

Nioradze indicates that in the cultural horizon there was found the right side of a human mandible with second and third molars missing, and a *ramus mandibularis*, broken in the upper part. The *corpus mandibularis* is in good condition. Its height, in the region of the second molar is, including the alveolar parts, 2.8 cm. The distance between the *spina mentalis* and the *foramenum mandibularis* is 6.5 cm.

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[1] Nioradze, G., "The Palaeolithic Industry of the Cave Devis-Hvreli," Travaux du Musée de Géorgie, Vol. VI, Tiflis, 1933, pp. 1–109.

Stone Industry.

The majority of the stone artifacts were made of local flint, only a few artifacts were made of obsidian. The numerous rejects and flint chips show that the artifacts were made on the spot.

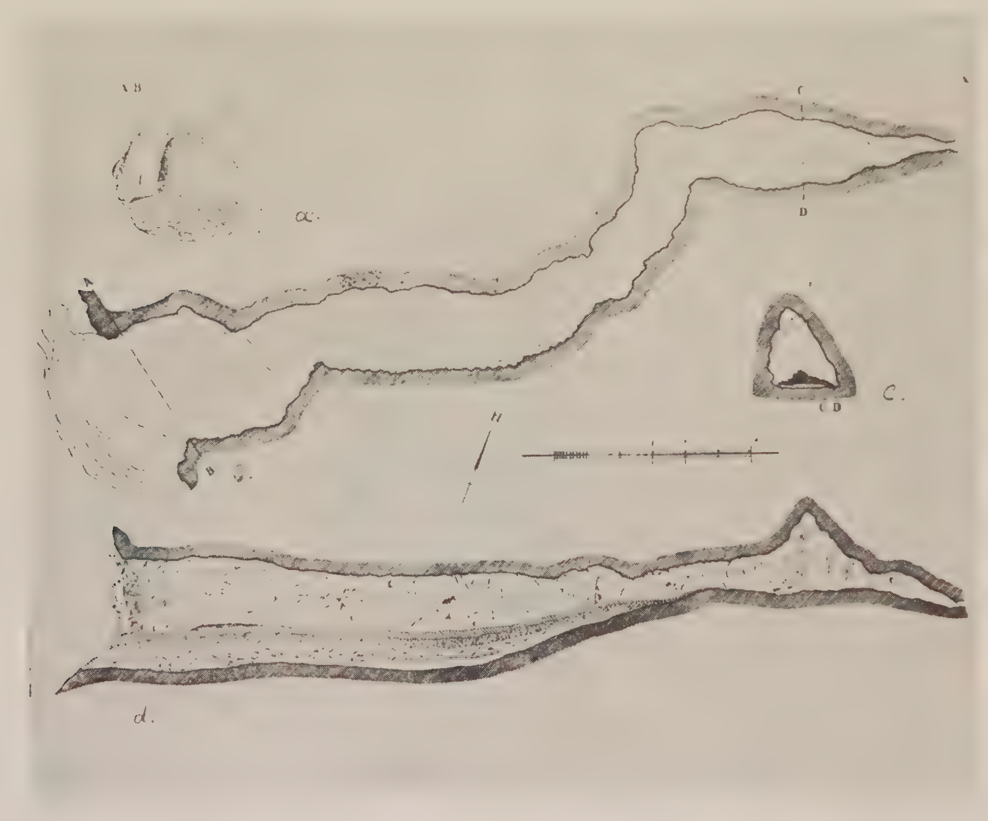

Fig. 28. The Cave Devis-Hvreli, Cutais Region, Caucasus. *a*, entrance, section along *A–B*; *b*, ground plan; *c*, section along *C–D*; *d*, vertical section, showing cultural layers. After Nioradze.

Nuclei.

These were very numerous, about two hundred, almost all of irregular shape, with the tendency to become conical. The majority of them are four and a half centimeters in height, while some are six centimeters. Nioradze distinguishes three groups:

1. With two striking platforms	92 specimens
2. With one striking platform	56 specimens
3. Others	52 specimens

Scrapers.—Scrapers constitute a very large percentage of the industry. The majority of them are of Upper-Palaeolithic type, the end-scrapers being definitely predominant. While Nioradze does not give the number of each type, the fact that there are forty-three nucleiform examples and some eight *grattoirs carénées*, may be significant. In general there is a great variety of forms, ranging from the rough side scrapers to the elegant *grattoirs museaus carénées*.

Burins.—Although bone work is very scarce, and no engraving was reported, *burins* are quite numerous. They fall into several types: *d'angle*, *bec de flûte*, and nucleiform. Their technique is somewhat rough though not uncertain. Double forms were encountered, but these are not numerous.

Points.—What Nioradze calls *Châtelperron* (Fig. 33, no. 1) is at the best a very poor example. The majority fall into the group of *La Gravette*, diminishing at times to microlithic dimensions, and some developing the side notch like the *pointe a cran atypique*. The points do not form the larger group of tools, in Devis-Hvreli as is the case of some other sites.

Perforators.—Several good examples of perforators with well-made points were found (Fig. 33, nos. 21–24). Others (Fig. 33, nos. 19–20) are somewhat atypical. The following implements are reproduced from the illustrations of Nioradze, which unfortunately are far from being perfect.

Fig. 29.

1. Conical nucleus with one striking platform.
2. Prismoidal nucleus with two striking platforms.
3. *Grattoir* on the end of a broken blade.
4. Notched side scraper.
5. *Grattoir* on the end of a broken blade. Nioradze calls it *grattoir bec de perroquette atypique* (?).
6. Nuclei-form scraper.
7. *Grattoir caréné.*
8. *Grattoir caréné.*
9. Massive scraper of rectangular shape.
10. Scraper of rectangular form with rounded corners.

Fig. 30.

1. End scraper and *burin bec de flûte.*
2. Double *grattoir.*
3. Round scraper.
4. Triangular scraper with round working edge.
5. Triangular scraper with round working edge.
6. Semi-oval side scraper of obsidian (Nioradze calls it "Bogen-formige").
7. Notched scraper.
8. *Grattoir* on the end of long blade.
9. Small end scraper.
10. *Grattoir* on the end of a long blade.
11. *Grattoir* on the end of a long blade.
12. Oval scraper with fine peripheral retouch.
13. Fragment of the long oval scraper.

Fig. 31.

1. *Grattoir museau.*
2. *Grattoir museau.*
3. *Grattoir* on the end of a long blade.
4. *Grattoir* on the end of a long blade.
5. *Burin d'angle.*
6. Double *burin bec de flûte.*
7. *Burin d'angle* (?).
8. *Burin bec de flûte.*
9. *Burin bec de flûte.*
10. Multi-facetted *bec de flûte.*

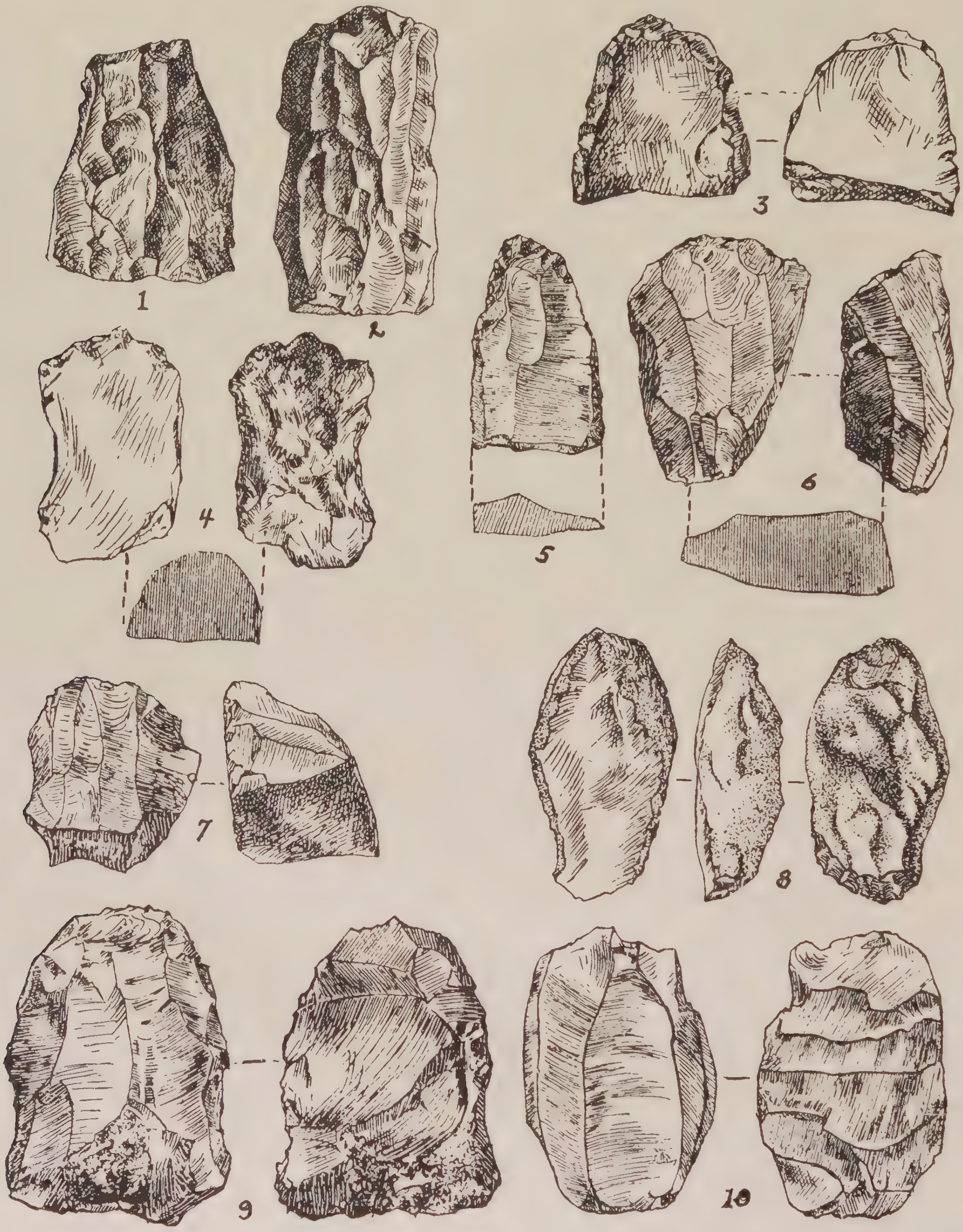
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Fig. 29. Flint Industry of Devis-Hvreli. After Nioradze.

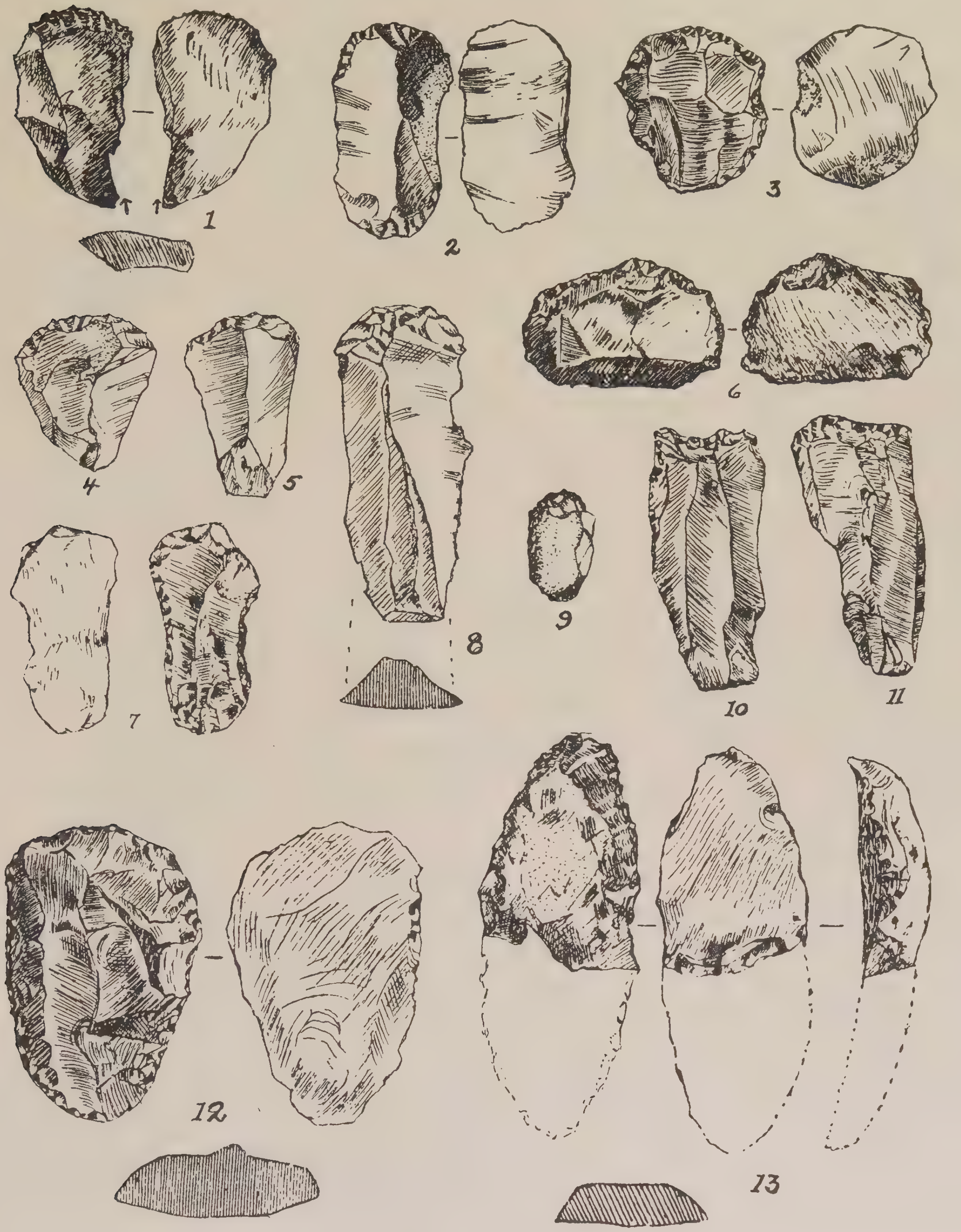
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FIG. 30. Flint Industry of Devis-Hvreli. After Nioradze.

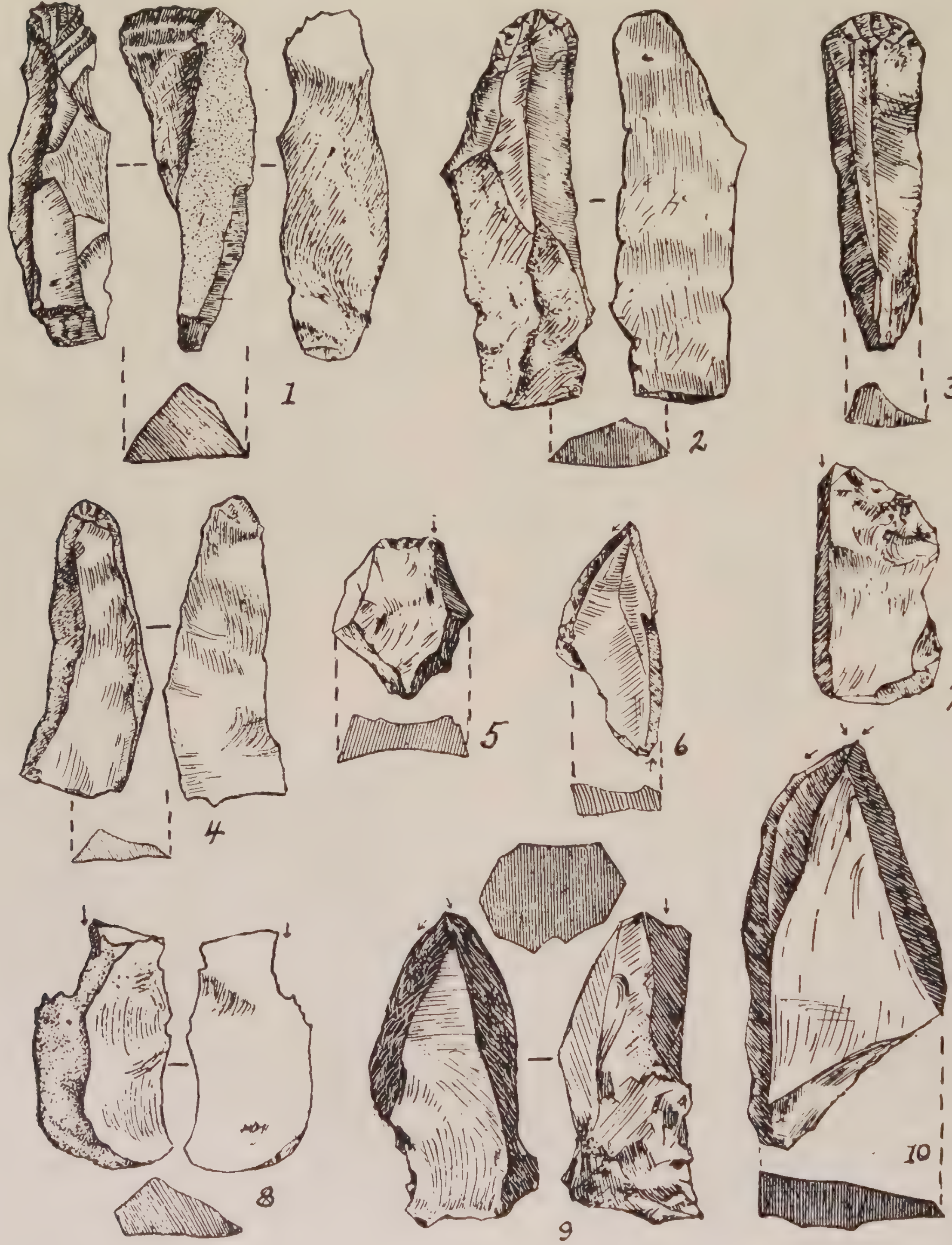
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FIG. 31. Flint Industry of Devis-Hvreli. After Nioradze.

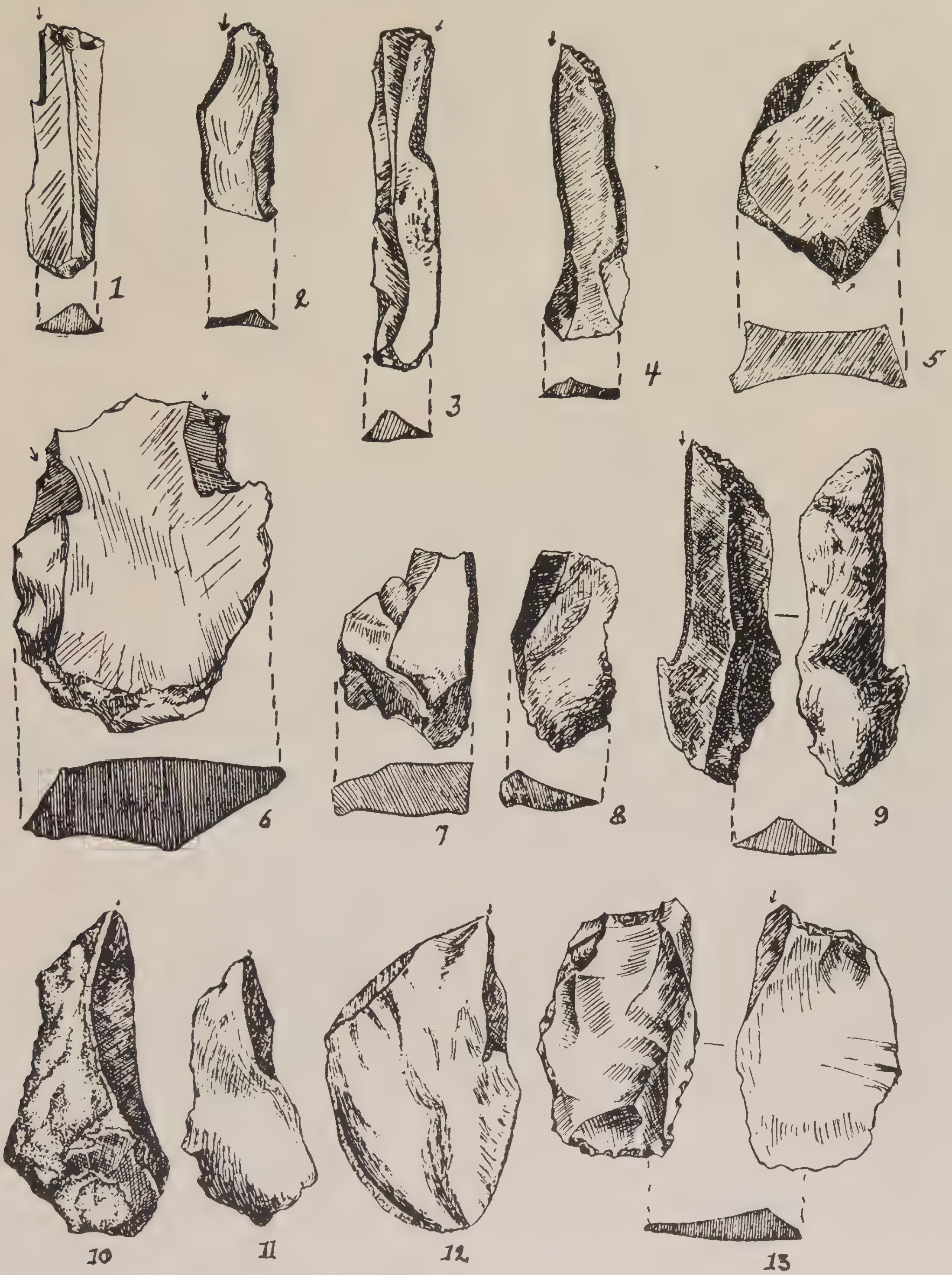
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FIG. 32. Flint Industry of Devis-Hvreli. After Nioradze.

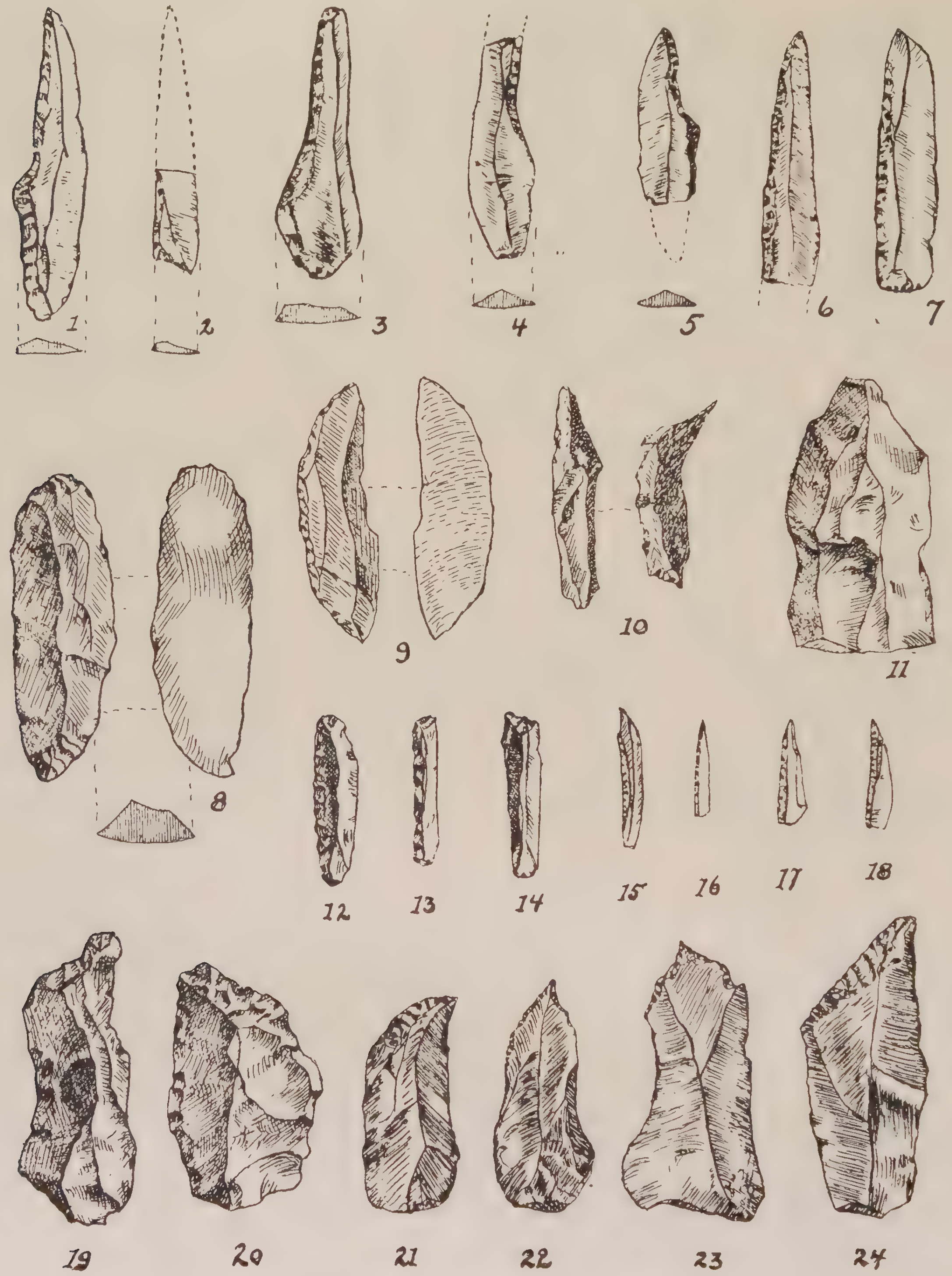
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FIG. 33. Flint Industry of Devis-Hvreli. After Nioradze.

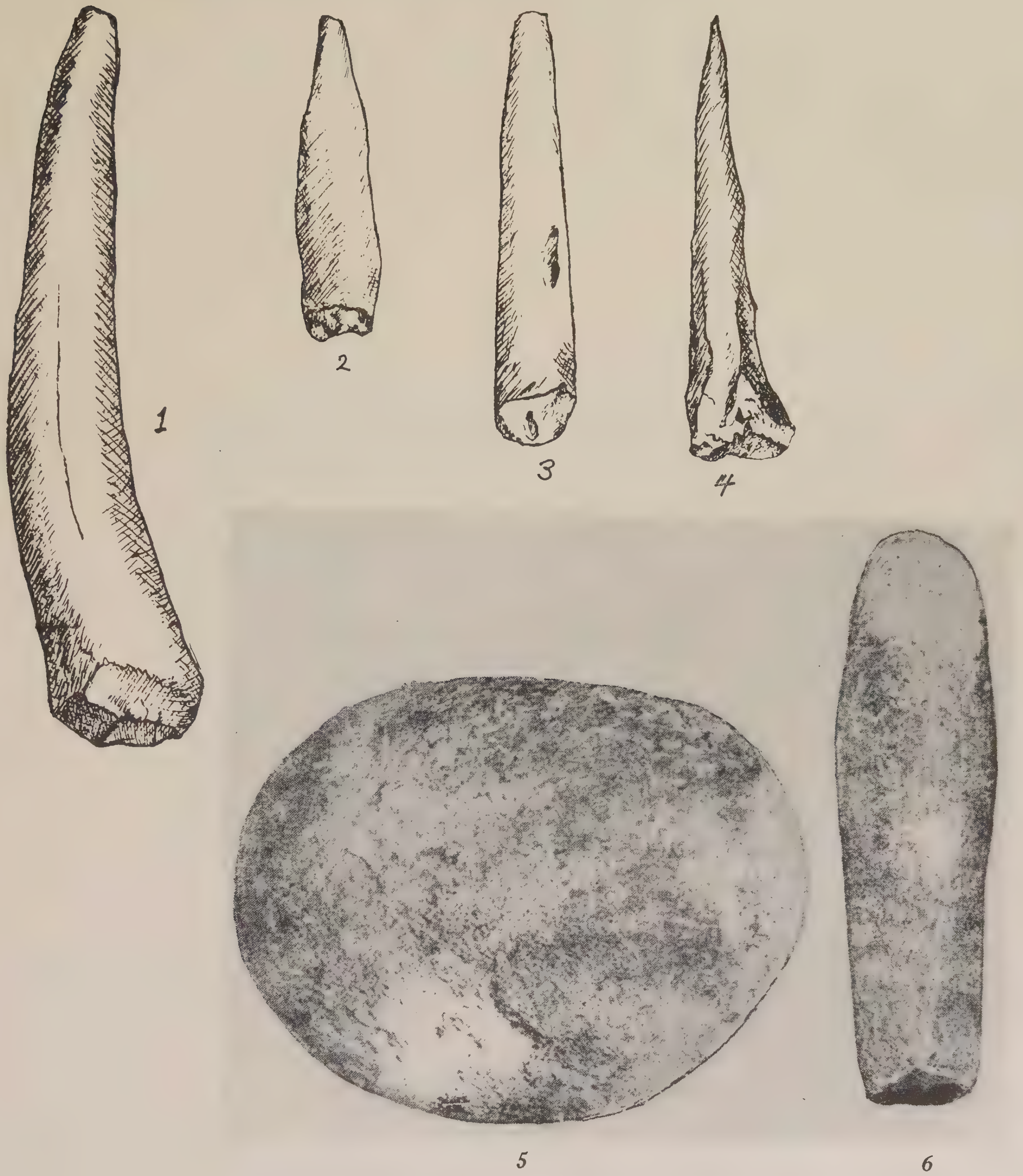

Fig. 34. Bone and Stone Implements of Devis-Hvreli. After Nioradze.

Fig. 32.

1. *Burin d'angle.*
2. *Burin d'angle.*
3. *Burin d'angle.*
4. *Burin d'angle* forming a point.
5. Double *bec de flûte.*
6. Nuclei-formed *burin.*
7. *Bec de flûte.*
8. *Bec de flûte.*
9. *Burin d'angle.*

10–13. *Burin bec de flûte.*

Fig. 33.

1. *Pointe a cran atypique* (?).
2. Fragment of *La Gravette* point (Nioradze calls it *pointe a cran atypique*).
3. *Pointe a cran atypique* (?).
4. *Pointe a cran atypique* (?).
5. Fragment of *pointe a cran atypique.*
6. *La Gravette* point.
7. *La Gravette* point.
8. Blade with retouch on both ends forming a point.
9. *Chatêlperon* point (?).
10. Flake (Nioradze calls them *lames a dos rabattu*).
11. An implement of peculiar form described by Nioradze in Georgian as "*shubis-tzverl*" (shubis meaning hitting implement; tzverl, end).

12–18. *Lamelle* of *la Gravette* type.

19. Retouched flake (Nioradze calls it "perforator").
20. Perforator.
21. Perforator on the end of a blade.

22–24. Perforator on the end of a blade.

Fig. 34.

1. Compressor of reindeer horn.
2. Bone awl.
3. Bone awl.
4. Bone awl.
5. Stone anvil.
6. Hammer stone (?).

Dating.—Nioradze hesitates to place any definite dating for Devis-Hvreli, feeling that it requires further research. He, however, feels that it may represent a special regional development of the Upper-Palaeolithic, corresponding and related to late Aurignacian and Capsian cultures.

3. Borshevo I

This site is situated near the village of Borshevo, Voronezh province, on the right bank of the Don River, 35 km. south of Voronezh, a few miles from the site of Kostenki I (see page 308). Here the Don River is separated from the high bank by the narrow terrace on which is situated the village of Borshevo. A number of small but wide gullies cut the river bank. On the left slope of so-called "Kuznetzov's Gully," near its mouth at the river, is the site Borshevo I.

Excavations of the Cultural Layer, Borshevo I. After photograph of Zamiatnin.

It was discovered in 1905 by A. A. Spitzin,[1] who found the bones of a mammoth in association with flint chips at a depth of 85 cm. Peasants digging for a cellar came across these bones, and the trial excavation pit made by Spitzin resulted in similar finds. He, however, felt that "the layers were very much mixed and that it is evident that all cultural remains fell down from above." [2]

Small excavations by S. N. Zamiatnin in 1922 resulted in the discovery of "hearths" with a large quantity of mammoth bones and a rich paleolithic industry. In 1923 and 1925 P. P. Ephimenko, continuing the excavations of Zamiatnin, found that the "hearths" without implements and bone heaps occupy a considerable area (Plate XIX).

The first "hearth" was in the backyard of one of the local peasants; the second, just beyond it. The cultural layer here had the same general appearance as that of Kostenki I, but the tools found were somewhat more crude.[3]

In 1925, larger excavations were conducted by P. P. Ephimenko, but as yet no account of them has appeared in print. The best illustrations of the finds, given by Sawicki,[4] are reproduced here, the short article of the excavator [5] forming the basis for the summary given below.

According to Ephimenko, Borshevo I is similar both in its general plan and stratigraphy to a series of other sites in the Kostenki-Borshevo region. The cultural horizon is in a layer of yellowish loam of diluvial origin, covered by a stratum of humus. At the implacement of the "hearths" the cultural finds begin even in the lower part of the humus, but usually are situated 120–135 cm. below the surface. Higher up the slope, though, where the humus is more heavily eroded, the cultural finds are much nearer the surface, and in places even exposed on the surface. The cultural layer increases in thickness as it proceeds upward.

The cultural complexes of this site consist of:

1. A number of "hearths" filled with broken and charred bones, masses of flint chips, and some finished tools.

2. Enormous accumulations of mammoth bones (long bones, broken to extract the marrow, shoulder blades, jaws, vertebrae, tusks, etc.). Usually flints, ochre, and charcoal are absent in these bone heaps.

The "hearths," as in the case of Kostenki I, have a more or less definite red color, due to the presence of ochre.

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[1] Spitzin, A. A., "Russian Paleolithic Period," Zapiski of the Imperial Russian Archaeological Society, Slavic Div., Vol. XI, Petrograd, 1915, p. 164.

[2] Spitzin, A. A., Otchet of Imperial Archaeological Committee, 1905, p. 184.

[3] Vishnevsky, B. N., "Pre-Historic Man in Russia," Appendix to Translation of Men of the Stone Age by Osborn, H. F., 1924, Leningrad, p. 460.

[4] Sawicki, L., "Materials for the Study of Russian Archaeology," Przeglad Archeologicznii, Vol. III, pp. 2, 3, 1926–1928.

[5] Ephimenko, P. P., "Some Results of the Study of Paleolithic Period in U.S.S.R.," Chelovek, No. 1, 1928, Leningrad, pp. 50–56. "Pre-Clan Society," Leningrad, 1936, pp. 357–359.

Fauna.[1]—

1. *Elephas primigenius*	numerous.
2. *Rhinoceros tichorhinus*	very scarce.
3. *Equus* (sp.)	numerous.
4. *Rangifer tarandus*	
5. *Canis* (sp.)	

As is seen from the list the fauna is not very varied, and consists mostly of the mammoth and a species of horse. Ephimenko mentions also several teeth of the marten and lynx.

Flint Industry (Figs. 35, 36, 37).—

The flint industry of Borshevo I consists mostly of points of *La Gravette* type, points *à cran atypique*, *burins* and scrapers, made of dark flint of chalk origin.

Points of la Gravette type (Nos. 1–5).

According to Sawicki, no. 2 is less typical and may be *lame en bias.*[2]

Lamelles à dos rabbatu (Nos. 6–26).

These are very numerous. Some of them approach the points, being retouched on both edges (nos. 6, 12, 26). The second edge forming the point is only partially retouched, and the end is often truncated (nos. 14, 16–18, 20–22).

Pointe à cran atypique.

These, with the exception of one (no. 28), are made on narrow blades; and the retouching sometimes is limited only to the notch (nos. 30–32, 35) or partly covers the other edge (nos. 29, 33, 34). In one case, there is a trace of retouching on the lower face (no. 35a). No. 36 may be a fragment of *Font Robert* type.

Burins.

Burins form an important group. There is a large proportion of nucleiform, multifacetted *burins* and double forms.

Burin d'angle double	No. 39
Burin d'angle on the retouched blade	Nos. 40–44
Burin d'angle opposed to lateral *burin*	No. 45
Burin d'angle on a wide retouched blade	Nos. 46–48
Burin d'angle on a thick flake	No. 49
Burin d'angle with notch	No. 50
Burin lateral, nucleiform, multifacetted	Nos. 51–53
Burin d'angle opposed to multifacetted *d'angle*	No. 54
Burin bec de flûte double	No. 55
Burin bec de flûte single	No. 56
Burin bec de flûte with revivification strokes	No. 57

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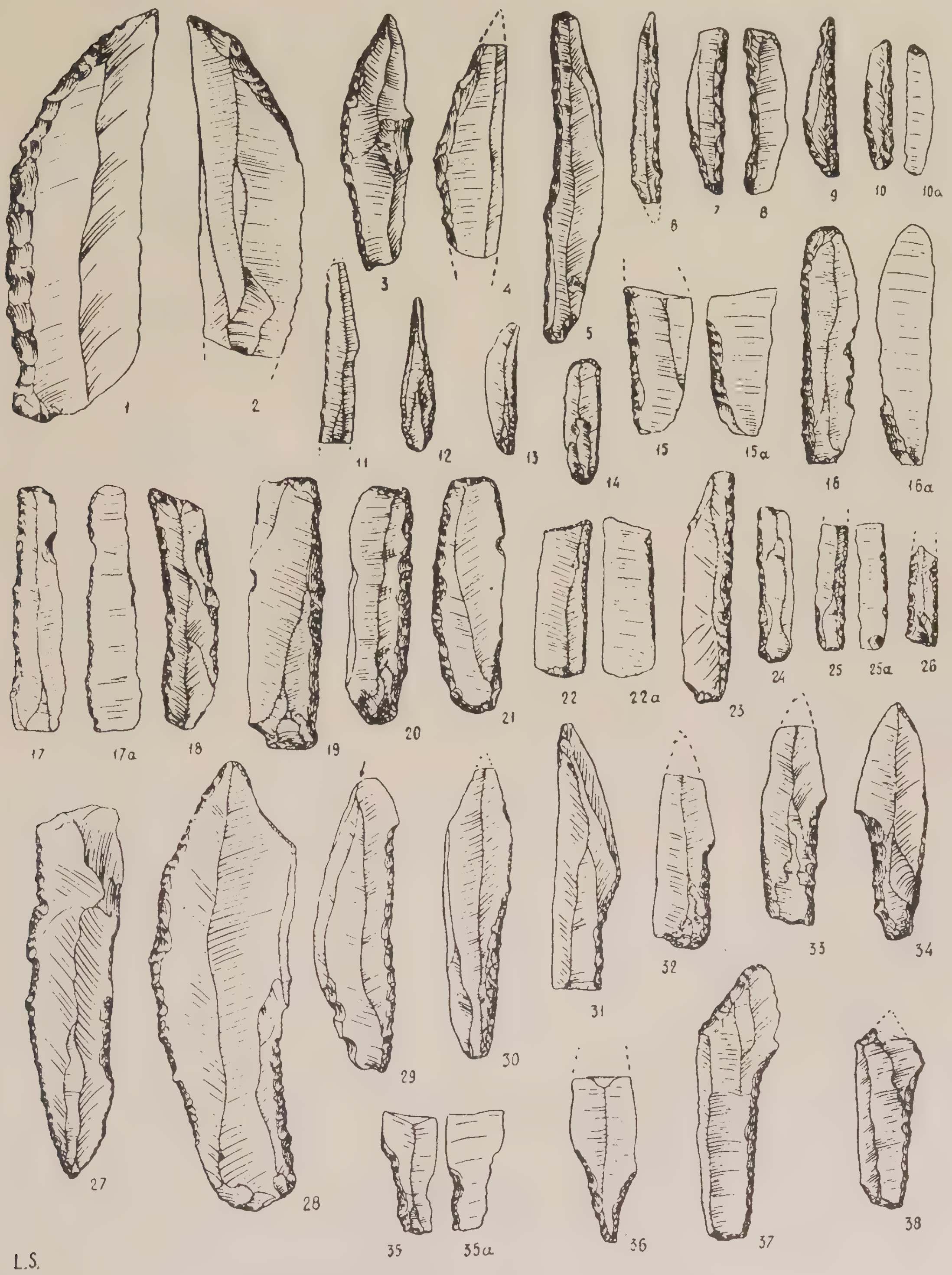
[1] Gromov, V. I., "Geology and Fauna of the Palaeolithic Period in U.S.S.R.," Problems of the History of Material Culture, Nos. 1–2, Leningrad, 1933.

[2] Ephimenko, P. P. ("Pre-Clan Society," Leningrad, 1936, p. 260), mentions as a special type flint points with dulled retouch on one side, which he considers to be of *Chatelperron* type, and decisive for the dating.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L.S.

Fig. 35. Flint Industry of Borshevo I. After L. Sawicki.

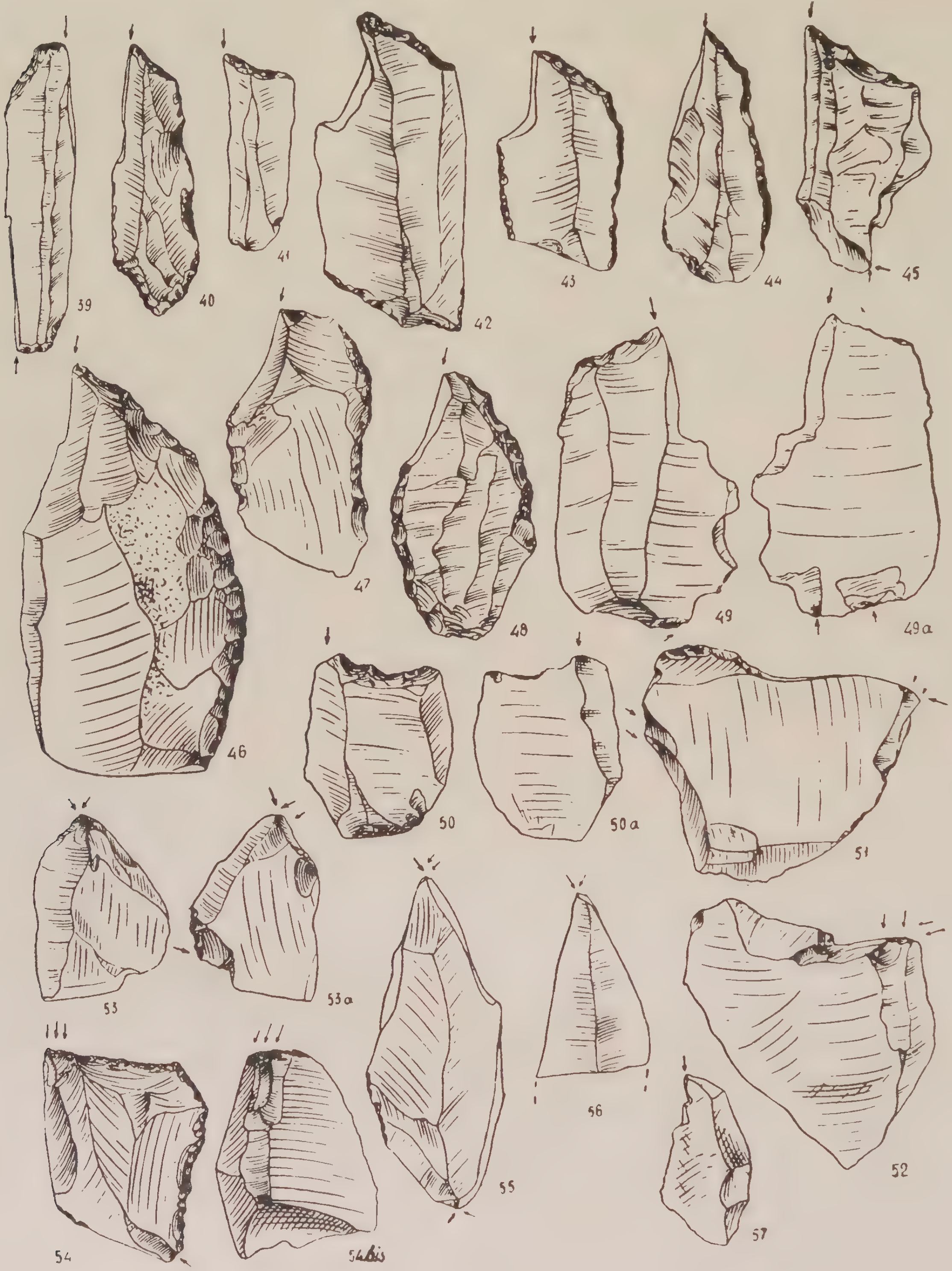
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Fig. 36. Flint Industry of Borshevo I. After L. Sawicki.

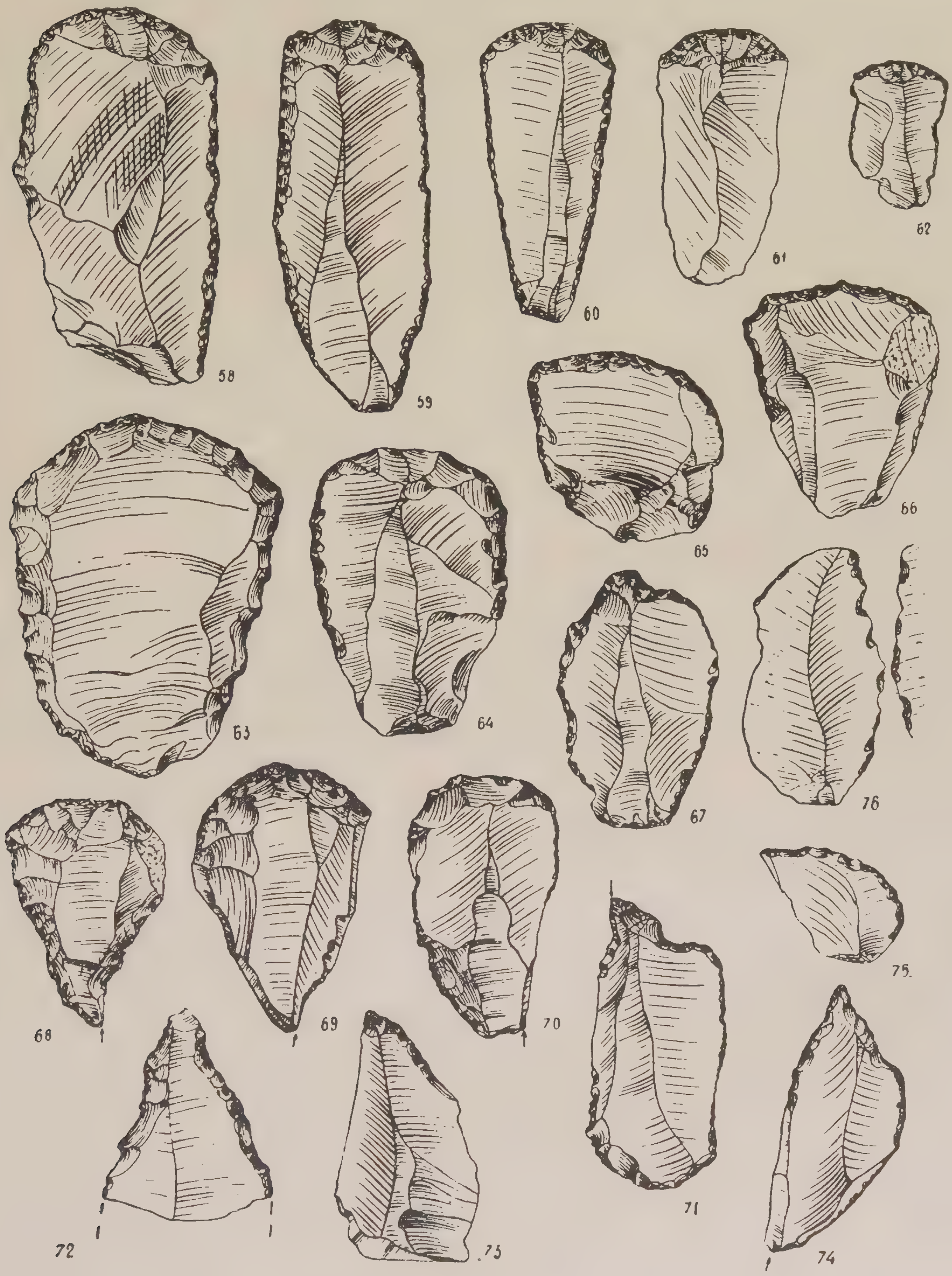
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Fig. 37. Flint Industry of Borshevo I. After L. Sawicki.

Scrapers.

Scrapers are of various sizes, made on the end of retouched blades or wide flakes, often double, or in combination with *burins.*

Grattoirs.

Grattoirs made on retouched blades	Nos. 58–60, 62
Grattoirs made on blade without retouch	No. 61
Grattoirs made on retouched flakes	Nos. 63–67
Grattoir and *burin d'angle*	Nos. 68, 70, 71
Grattoirs and *burin bec de flûte*	No. 69

Percoirs.

Percoirs are not typical (nos. 72–74). No. 74 has *burin d'angle* on the opposite end.

In general, according to Ephimenko,[1] the flint industry of Borshevo I is quite similar to that of Kostenki I, consisting of the same general types of tools, but of a more archaic form. Thus in Borshevo I, the end scrapers have more often side retouch than those in Kostenki I. Likewise, Borshevo I abounds in massive, nucleiform *burins; point à cran* is smaller, less typical, nearer the type found in the early loess sites such as Willendorf and does not have Solutrean retouch.[2]

The Bone Industry.

Ephimenko [3] mentions the find of a fragment of a large pointed tool, made of mammoth ivory, but gives no illustration. S. N. Zamiatnin has found also three tiny mother of pearl discs,[4] perforated in the middle, which were apparently used for decoration. He also found a pendant made from the perforated incisor of a horse, and a tertiary shell filled with light red iron pigment which was previously well powdered and mixed with some other substance.[5]

Dating.

Savitsky considers Borshevo I as belonging to the Upper Aurignacian culture, especially on the basis of similarity with Du Ruth, Noaille, La Ferrassie and Font Robert. He does not differ essentially from Ephimenko, who thinks that Borshevo I belongs to the same age as the group of "Aurignacian-Solutrean" sites such as Willendorf, Predmost and others. He points out however that Borshevo I is somewhat earlier than any of the sites mentioned, because of the presence of the *Chatelperron* type of points which he considers characteristic for the Aurignacian.

4. Kostenki I

This very important station is situated in the village of Kostenki ("kost"—meaning "bone" in Russian; Kostenki-bone village), 35 km. south of Voronezh, on the right bank of the river Don. The history of this site is very romantic. The finding of many mammoth-bones is responsible for the name of the place. Local legends attribute the bones to the mythical giant animal "Inder," who lived under the ground, and whose bones, after his death, appear on the surface. Another legend describes, in picturesque detail, the death of this monster. The giant animal was passing the territory of Kostenki with his young and came to the river Don. The river was too deep for him to wade across and he decided to drink it dry, which he did. When he turned around to call his young, his body could not withstand the strain of so much water, and he burst, the bones flying in different places where they are now found.[1]

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[1] Ephimenko, P. P., "Pre-Clan Society," Leningrad, 1936.

[2] Ephimenko sees in these points the prototypes of the Solutrean type of *point à cran* as found in Kostenki I.

[3] Ephimenko, P. P., "Pre-Clan Society," Leningrad, 1936, p. 360.

[4] Ephimenko, P. P., "Pre-Clan Society," Leningrad, 1936, p. 360.

[5] Ephimenko, P. P., "Pre-Clan Society," Leningrad, 1936, p. 360.

Another tradition held that the bones were the remains of the exhausted elephants of the army of Alexander the Great.

A report by De Bruin[2] attracted the attention of Peter the Great, and later Catherine II, who directed Gmelin, a member of the Academy of Sciences, to make an investigation. Gmelin visited Kostenki in 1768–69, and reported the presence of mammoth bones in the village and its vicinity.[3]

In the summer of 1879, I. S. Poliakov found many bones both in the secondary deposition, as well as *in situ*, where they were accompanied by cultural remains. Two years later, the excavations of Poliakov[4] were continued by A. E. Kelsiev,[5] whose more extensive excavations revealed similar material.

Next followed a number of visits by various investigators, Stukenberg, Krishtophovich, etc., who, however, made only small trial pits.

In 1915, S. Krukovsky made extensive excavations, resulting in very rich material. S. N. Zamiatnin, in 1922, working on the adjoining site of Borshevo I, made a few trial pits in Kostenki I, and continued his work in 1923 with P. P. Ephimenko, who later devoted himself more systematically to the study of this site, returning there in 1926, 1931, 1933.

As a result of the various investigations the quantity of the material gathered by the investigators is large and complex in nature, but descriptions are not always available. I will endeavor to describe the most important results of each investigator, as far as material at hand allows, before giving the general summary of the site.

Geology.—The vicinity of Kostenki is part of a large plateau, which forms the steep right bank of the Don in the province of Voronezh. This bank is a formation of chalk covered by typical glacial clay with small boulders of diorite, granite, and quartzite. The valley of the Don has two well pronounced terraces: the ancient high terrace, which is not flooded in the spring by the river, and the recent, lower terrace, which is annually flooded. The base of the terrace is sand, which is covered with thick deposit of reddish or grey clay, schistous in structure, sometimes with pebbles of white chalk. All this is covered by the layer of humus, fully five feet thick. The present village of Kostenki is situated on this ancient terrace. In the upper layers of the terrace clay were found the palaeolithic remains.

Location.—A number of deep gullies divide the village into several sections:

(*a*) Popov Log.
(*b*) Pokrovsk Gully, the center of the village, the site of Kostenki I.
(*c*) Anosov Log—Kostenki II.
(*d*) Alexandrovsk Gully—Kostenki IV.

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[1] Zamiatnin, S. N., "Notes on Prehistory of Voronezh Region," Voronezh, 1922, p. 6.

[2] De Bruin, "The Travel in Moscowie," 1701, p. 130.

[3] Gmelin, S. G., "Travel Through Russia for the Investigation of the Three Kingdoms of Nature," 1769.

[4] Poliakov, I. S., "Anthropological Trip to Central and Eastern Russia," Zapiski of the Imperial Academy of Sciences, Vol. XXXVII, pt. 1, St. Petersburg, 1880.

[5] Kielsiev, A. F., "The Palaeolithic Kitchen Refuses in Village Kostenki, Voronezh Province," Trudi of the Moscow Archaeological Society, "Drevnosti," Vol. IX, pp. 154–179.

Excavations of Poliakov and Kielsiev.—Although Poliakov did not find the spot indicated by Gmelin, he, nevertheless, discovered the palaeolithic remains in the center of the village at the mouth of "Pokrovsk Gully." Thus, he writes: "In the clay immediately below the humus I began to encounter the first typical flint flakes; then I noticed clay mixed with ashes and flint implements and, finally, with these, the fragments of the teeth and shoulder blade of a mammoth."[1] A considerable number of flint implements and bones of fossil animals were collected. This material is now preserved in the Museum of Anthropology and Ethnography of the Academy of Sciences in Leningrad.

Fauna.—Most of the bones found by Poliakov were those of a mammoth, chiefly ribs, shoulder blades, teeth and tusks. They were scattered, absent in some places and numerous in others. Sometimes they appeared to be purposely sorted, shoulder blades in certain places and tusks in others. The long bones had been broken to extract the marrow. The bones of other animals were rare, only teeth of bear and small *carnivorae*, marten, and skunk being identified. All these were concentrated near the remains of the open "hearth" and represent typical kitchen refuse. In spite of the small size of the excavations, bones of at least sixteen mammoths were found.

Flint Industry.—The tools were made of semi-translucent, smoke-colored or almost black flint which is found along the right bank of the Don River in the form of pebbles, covered with ochreous patination. Traces of similar crust could be seen on many implements. They are large and were obtained by a skillful stroke on the flat surface of a flint pebble so that the lower surface is usually flat, producing a flat, long, and wide implement with two cutting edges.

The flint implements showed a considerably advanced technique. The flakes were clean, the lower side smooth, the upper side worked, with several well-made facets. The edges were sharp, sometimes with fine secondary retouching. The best finds were near the "hearth."

Hearths.—At least three "hearths" are found, which are characterized by a mass of ashes, charred bones, and stones with traces of fire action. According to Ephimenko,[2] these "hearths" are the cultural accumulations on the sites of former dwellings. They are easily distinguished in the light ground by their dark coloring, and by the presence of bones. They have a characteristic reddish tint, due to the presence of powdered ochre, large supplies of which were found in Kostenki I.

No mention of worked bone is made by these investigators though the large number of gravers indicated a bone industry. This supposition was confirmed later.

In 1912 part of this collection was studied by R. R. Schmidt, who intended to publish the results. On the basis of his manuscript, Max Ebert wrote in 1921 concerning Kostenki I in "Sud Russland in Altertum."

Flint Industry.

The flint material from the Poliakov and Kielsiev collections was described by P. P. Ephimenko,[3] whose summary is given below.

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[1] Poliakov, I. S., "Anthropological Trip to Central and Eastern Russia," Zapiski of the Imperial Academy of Sciences, Vol. XXXVII, St. Petersburg, 1880.

[2] Ephimenko, P. P., "Palaeolithic Site on Kostenki," Annual Report of the Russian Anthropological Society, Vol. V, St. Petersburg, 1915.

[3] Ephimenko, P. P., "Palaeolithic Site on Kostenki," Annual Report of Russian Anthropological Society, Vol. V, St. Petersburg, 1915.

Nuclei are absent in Poliakov's and rare in Kiẹlsiev's collection, but Ephimenko considers this accidental. One of Poliakov's nuclei is really a hammer stone.

Blades (*lames*) have either three or four facets, are irregular in form, and are rarely over 10 cm. long, the majority being smaller. Many have retouched sides (saws) or are similar to "*lames à dos rabattus*" of Kielsiev's collection. Really, they are nearer to "*pointes à cran atypique*" with certain massive, wide and short flakes reminding one of Levallois.

Scrapers.—Two types can be distinguished: (*a*) Convex scrapers (over twenty specimens) are made on the ends of wide flakes by means of curved retouch which at times is continued on the sides. Often, the other end is made into a graver (Fig. 38, no. 12). Straight end-scrapers and double scrapers were also found. In general, they are different from Magdalenian forms and much nearer those of the Solutrean.[1]

(*b*) Concave scrapers were found, usually in the form of irregular flakes with small segment-like retouch on one side, more rarely on the end.

Perforators.—Perforators (*percoirs*) are absent in Poliakov's collection, and only two were found in Kielsiev's material in spite of their common occurrence in all Upper Palaeolithic stations. This may be accidental, for in the case of Mezine (see pp. 335–346) most of the perforators were found in one spot of the site.

Gravers (*burin*) are represented by a numerous group, including such types as simple middle gravers (*burins ordinaires*), the side gravers (*burins lateraux*), the angle gravers (*burins d'angle*), and often *burins nuclei* on the end of broken blades (Fig. 38, nos. 6–9). There is a certain negligence in their manufacture, distinguishing them from the fine forms of the Magdalenian type. According to Ephimenko no "*burins busqué*" were found in Kostenki I, contrary to the assertion of R. R. Schmidt.

Points form the most interesting group, especially for the purpose of dating. While the rest of the implements are retouched on one face only, the points have bifacial retouch (the lower side being worked near the tip) forming wide flakes, perhaps made by pressure. In typical cases, these points are on large, massive blades, one or both ends of which are sharpened from the lower face by secondary retouch. Usually, one end is flatter and sharper than the other. Often, on one edge there is a notch (*cran*) quite analogous to the "*pointes à cran atypique.*"

Ephimenko further states that the absence of the *burin busqué*, the thumb scraper, and the *Châtellperron* points does not permit one to accept the Aurignacian dating of R. R. Schmidt. The bilateral chipping of points and the types of notched points may be either proto-Solutrean or the degeneration of Solutrean technique. The arguments pro and con are about equal. Thus, the *pointes à cran atypique* are quite similar to those of La Ferrassie, La Font Robert, Grotto de St. Font, Noailles, Combe-Capelle, Mentone, Trou Magrite, Munzingen, Sirgenstein, Willendorf, and Hundssteig. They could be considered the result of the evolution of the blades with retouched side of Aurignacian type. On the other hand in La Madeleine and other stations, Peyrony found many similar points, suggesting a degeneration of the typical Solutrean in pre-Magdalenian (IV–?) times.

Max Ebert considers Kostenki I as belonging to the transition period between the Aurignacian and Solutrean, of the so-called Font Robert culture, this agreeing with the proto-Solutrean theory of Ephimenko.

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[1] Ephimenko tries to indicate post-Aurignacian age at these scrapers, using the term Solutrean in a temporal sense. (E. G.)

Very good illustrations of flint industry from Poliakov and Kielsiev excavations are given by L. Sawicki, who had the opportunity in 1924 to study and make drawings of the typical implements from the material of the Moscow State Historical Museum. He reproduces after Ephimenko from Poliakov's collection the following types:

Poliakov Excavations (Fig. 38, nos. 1–13)

Small backed blades	no. 1
Small *pointe à cran*	no. 2
Large *pointe à cran*	nos. 3–7
Burin d'angle	nos. 8–10
Burin bec de flûte	no. 10
Burin plane	no. 11
Grattoir—burin bec de flûte on massive flake	no. 12
Grattoir on massive wide blade	no. 13

Kielsiev Excavations (Figs. 39–44, nos. 1–57)

Nos. 1–9. Backed blades of la Gravette type.

Nos. 10–11. *Pointe à cran atypique.*

No. 12. Long wide blade pointed by retouch on the right edge. The lower face presents the Solutrean type of retouch, from both edges. The lower half of the right edge is roughly retouched, suggesting *pointe à cran.* The bulb is removed by retouch of the lower face.

No. 13. *Pointe à cran atypique.*

No. 14. Blade with partial bifacial retouch. (*Pointe à cran atypique* ?).

No. 15. Fragment of retouched blade with slight inverse retouch.[1]

No. 16. *Burin d'angle-grattoir* with left edge retouched forming a notch.

No. 17. Asymmetrical blade with partial retouch on both faces. Fine steep retouch on the right edge forms a notch. *Burin* stroke on the end (?).

No. 18. Fragment of a long blade retouched on one side. The bulb is removed by flat retouch on the lower face.

No. 19. Same as No. 18, with truncated end retouch. (*Burin* stroke ?).

No. 20. Leaf-shaped blade, with partial bifacial retouch, mostly on the lower face, on each end. Recalls proto-Solutrean technique.[2]

No. 21. Asymmetrical blade with retouch principally on the lower face.

Nos. 22–23. Pointed blades, bifacial retouch toward the point.[3]

No. 24. *Burin plan* (?) on a long blade.

No. 25. Fragment of blade with alternate bifacial retouch.[4]

No. 26. Leaf-shaped blade with broken point (?) retouched on both edges.

No. 27. Blade with partial bifacial retouch on both edges.

No. 28. Wide flake retouched on left edge, both ends scaled by use.

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[1] Compare Sawicki, L., "La Grotte Nietoperzowa à Jerzmanowice près Ojcow (District Olkusz)," Revue Archeologique Polonaise, Vol. III, Pt. 1, pp. 1–8, Plate II, no. 11.

[2] Compare Sawicki, L., "La Grotte Nietoperzowa à Jerzmanowice près Ojcow (District Olkusz)," Revue Archeologique Polonaise, Vol. III, Pt. 1, pp. 1–8, Plate III, no. 4, 4a.

[3] Compare Sawicki, L., "La Grotte Nietoperzowa à Jerzmanowice près Ojcow (District Olkusz)," Revue Archeologique Polonaise, Vol. III, Pt. 1, pp. 1–8, Plate IV, nos. 13, 14.

[4] Ibid., Plate II, no. 14.

No. 29. Long blade beautifully retouched on both edges.[1]
No. 30. Fragment of asymmetrical blade with alternative retouch and a notch formed by bifacial retouch on one edge.
No. 31. Long blade retouched along the left edge, one end forms the end scraper, the other shows scaling or inversed retouch on the lower face.
Nos. 32–33. Tools scaled by use (*utiles écaillées*).
Nos. 34–37. End scrapers on a broken blade.
No. 38. Almost rectangular, double end scraper with fine retouch along both edges, made on a wide, flat blade. The lower face shows the reduction of the bulb.
No. 39. Tool made of wide flake, completely retouched on one face only, with secondary peripheral retouch.
No. 40. The same, one end showing traces of retouch or use on the lower edge.
No. 41. Large flake.
No. 42. *Burin d'angle.*
No. 43. *Burin d'angle* with the *burin* stroke on the opposite end (?).
No. 44. Multifacetted *burin* on broken retouched blade.
No. 45. *Burin d'angle* and multifacetted *burin* on the other end.
No. 46. *Burin d'angle* and *burin plan* on retouched blade.
No. 47. Same as 45.
No. 48. Nucleiform multifacetted *burin.*
No. 49. *Burin d'angle.*
No. 50. Multifacetted nucleiform *burin.*
No. 51. *Burin* on the end of a retouched blade.
Nos. 52–53. Double *burin.*
No. 54. Multifacetted (*plan, d'angle,* etc.) nucleiform *burin.*
No. 55. Multifacetted nucleiform *burin.*
Nos. 56–57. Nuclei, probably re-utilized as *grattoirs.*
No. 58.[2] Stone figurine representing mammoth.
No. 59. Small ivory female figurine of Kozlovsky's excavations.
No. 60. Ivory tool.
No. 61. Bone implement of unknown use.

Sawicki[3] calls nos. 10–21 *pointes à cran,* distinguishing several types, characteristic for Kostenki. He uses the term of *Font-Robert* as the equivalent of Proto-Solutrean in describing nos. 4, 7, 8, 22, 25. It is possible that some of his *pointes à cran* are very distant eastern relatives of the typical implements. He considers Kostenki as the eastern phase of the middle European Solutrean with Hungary as the center.

Krukovsky's Excavations.—This Polish archeologist made in 1915 large excavations in Kostenki I, finding the same general conditions as did the previous investigators. He has also found traces of "a hearth" with a number of flint implements and bones of fossil animals. It is very unfortunate that the results of his excavations are as yet unpublished as his material is very rich, consisting of several thousand flakes and several hundred finished tools. It was preserved in the Voronezh State Museum.

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[1] Ibid., Plate II, no. 15.

[2] Nos. 58–61 are from P. P. Ephimenko collection, according to L. Sawicki.

[3] Sawicki, "Le Grotte Nietoperzowa à Jerzmanowice près Ojcow (District Olkusz)," Revue Archeologique Polonaise, Vol. III, Pt. 1, pp. 1–8.

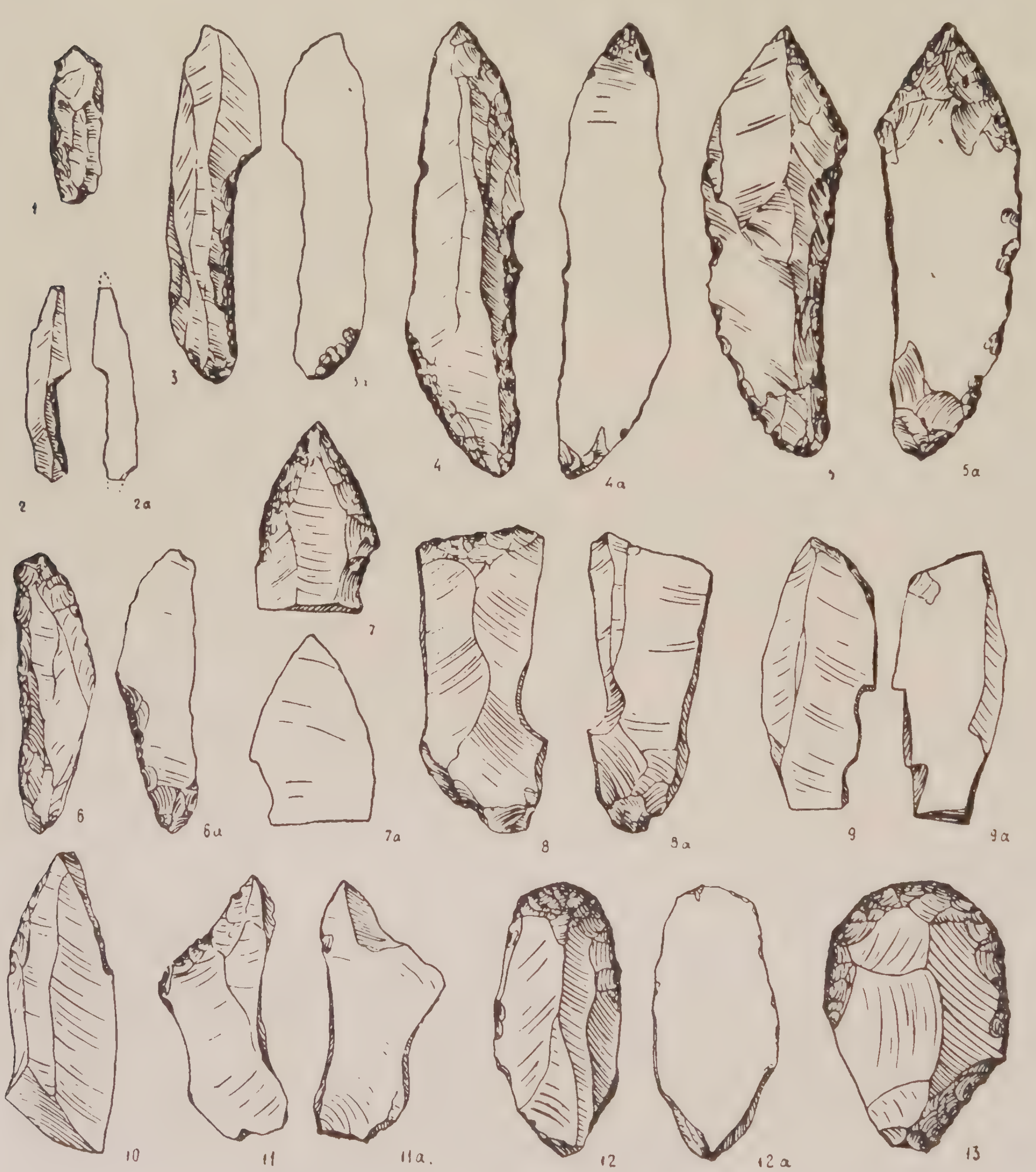
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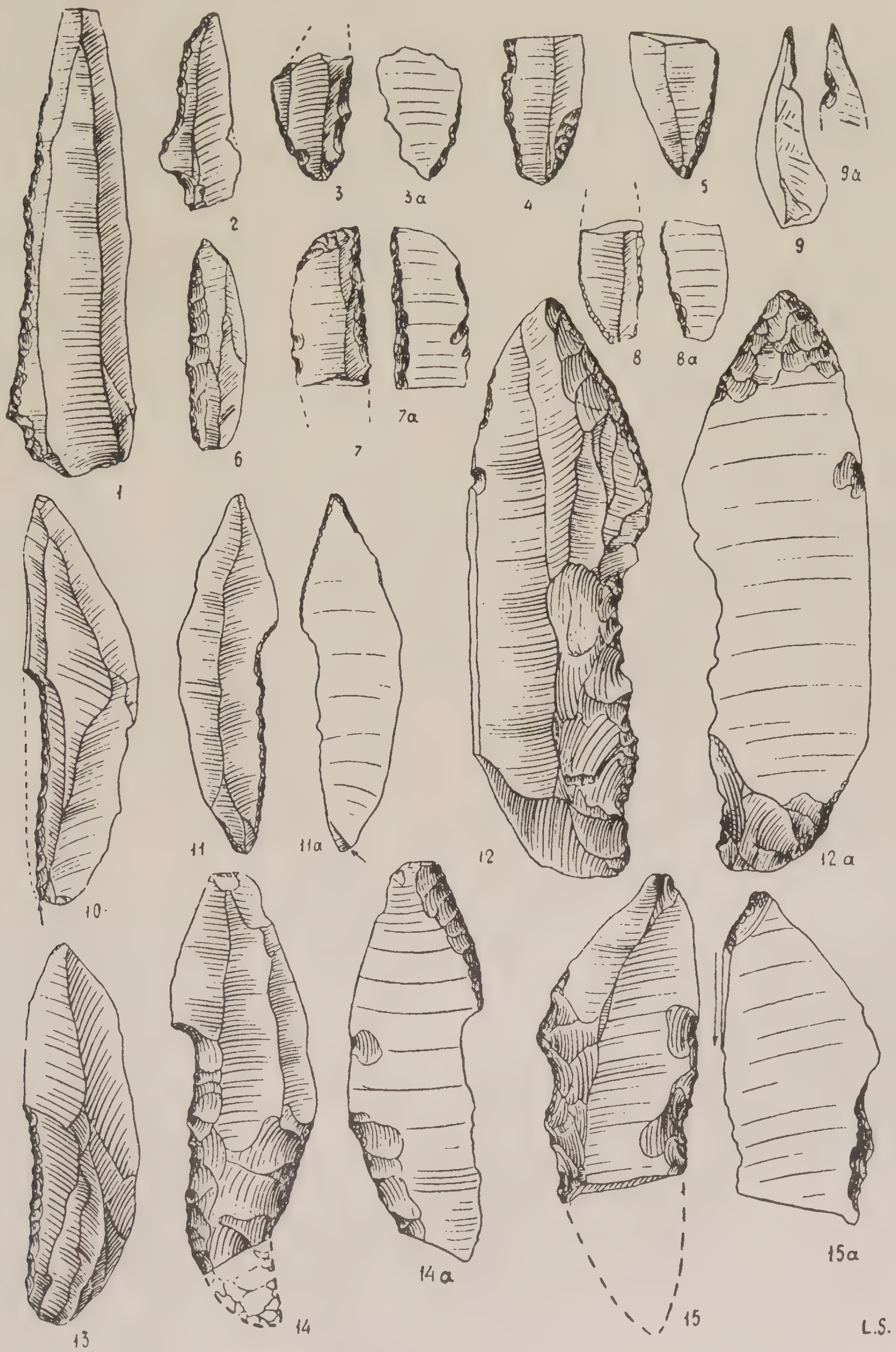
Fig. 38. Stone Industry of Kostenki I. Poliakov's Excavations. After L. Sawicki.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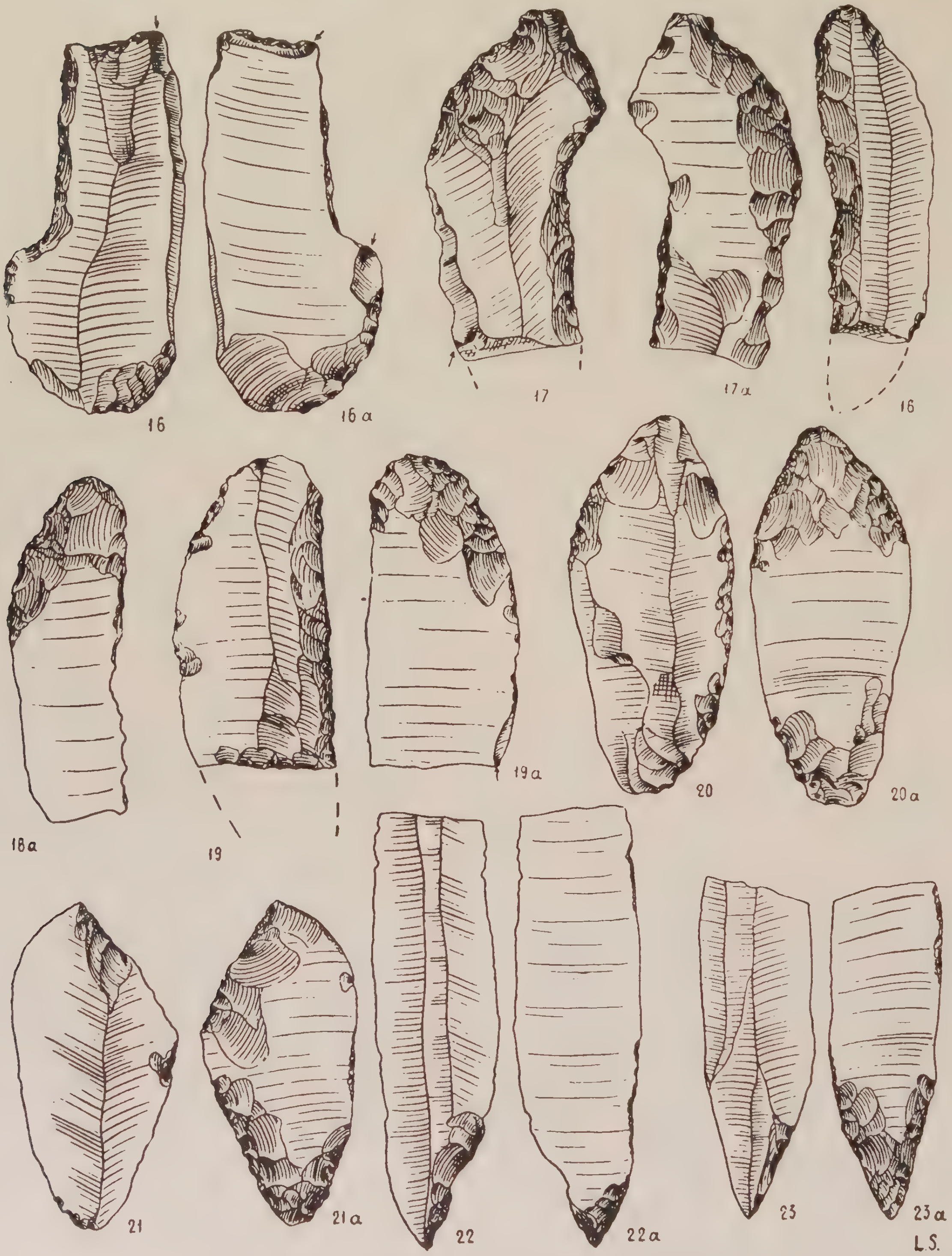
L.S.

Fig. 39. Stone Industry of Kostenki I. Kielsiev's Excavations. After L. Sawicki.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16 a
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17 a
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18a
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19a
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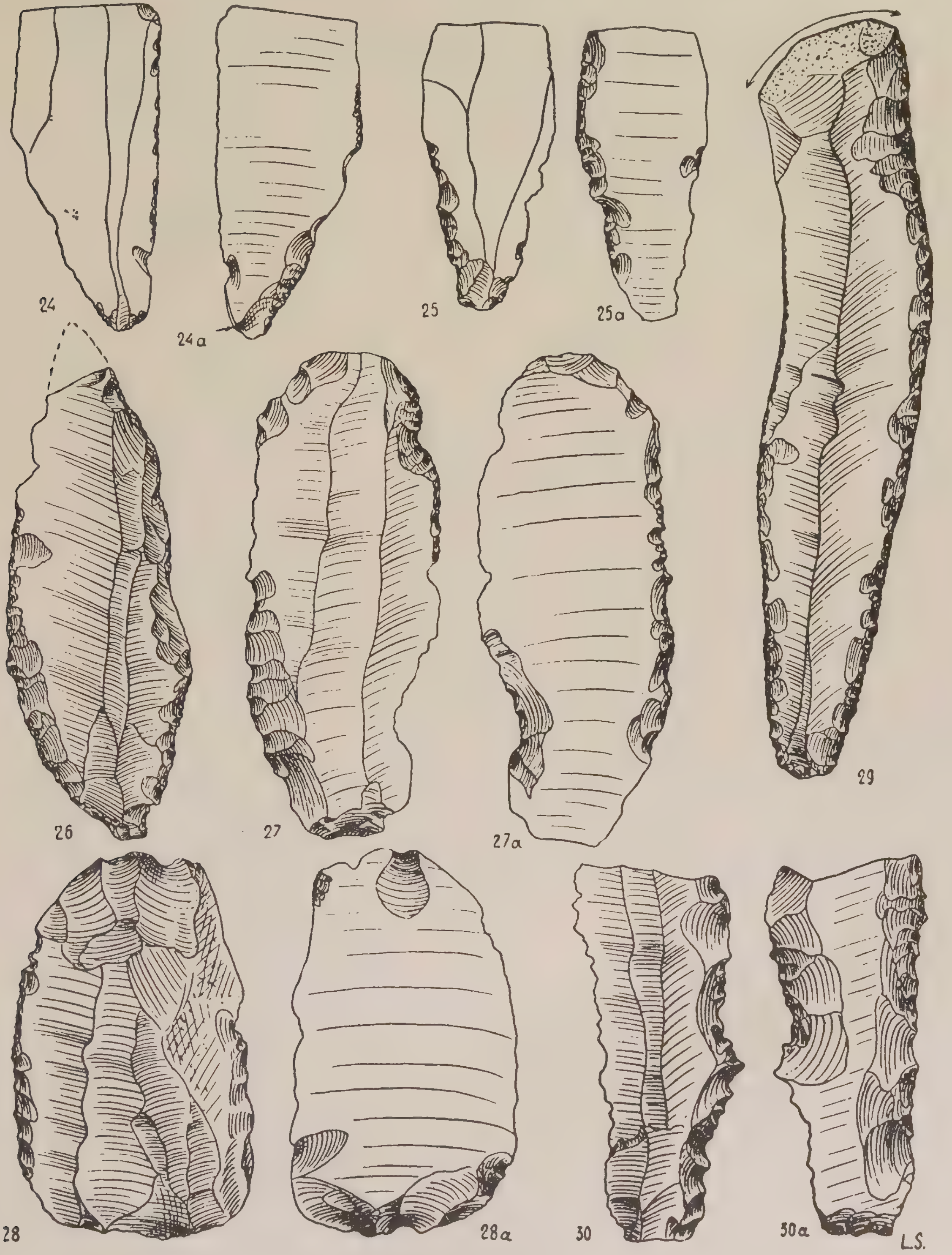
23
23a
L.S.

Fig. 40. Stone Industry of Kostenki I. Kielsiev's Excavations. After L. Sawicki.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24a
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27a
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28a
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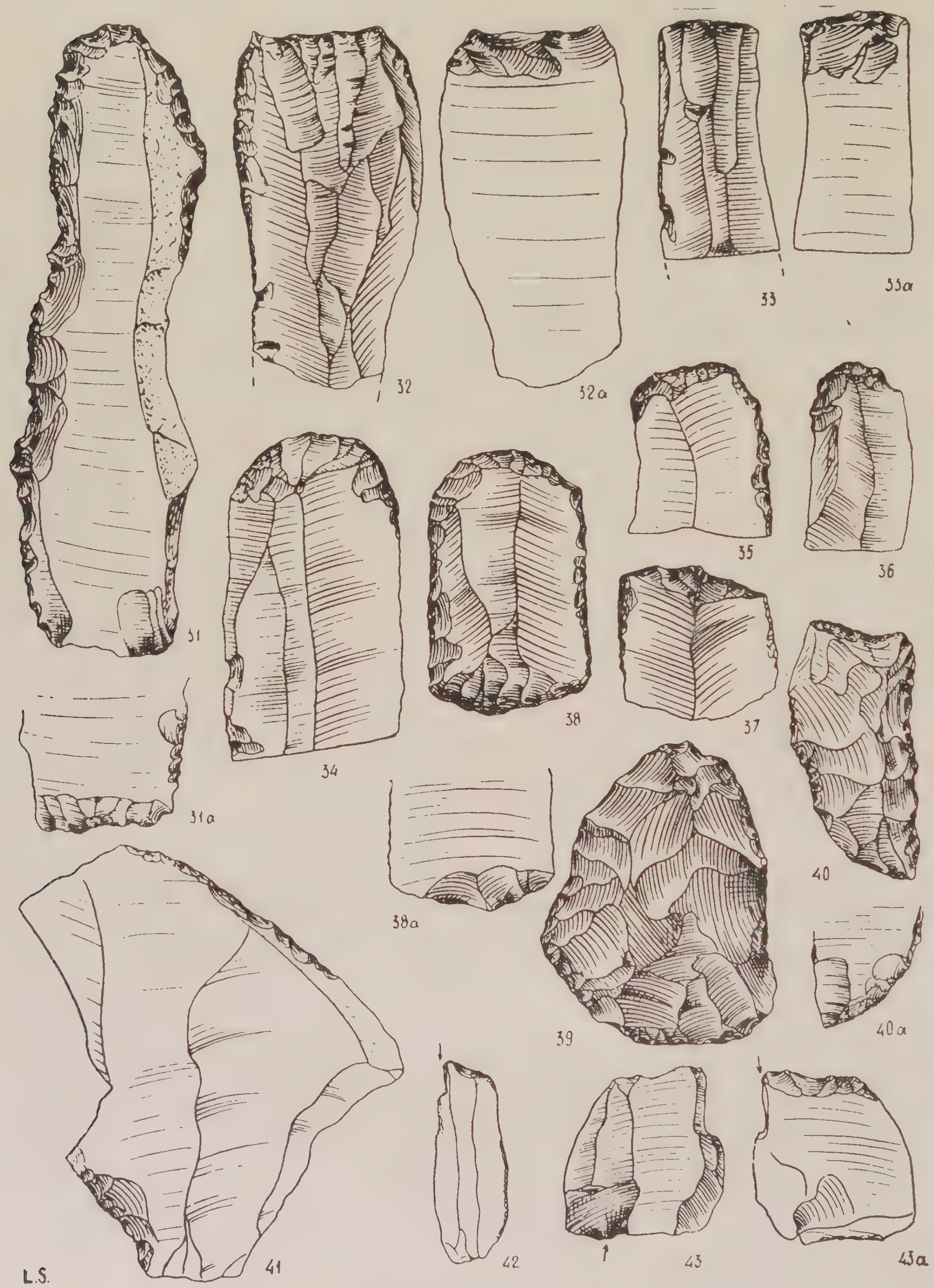
30a
L.S.

FIG. 41. Stone Industry of Kostenki I. Kielsiev's Excavations. After L. Sawicki.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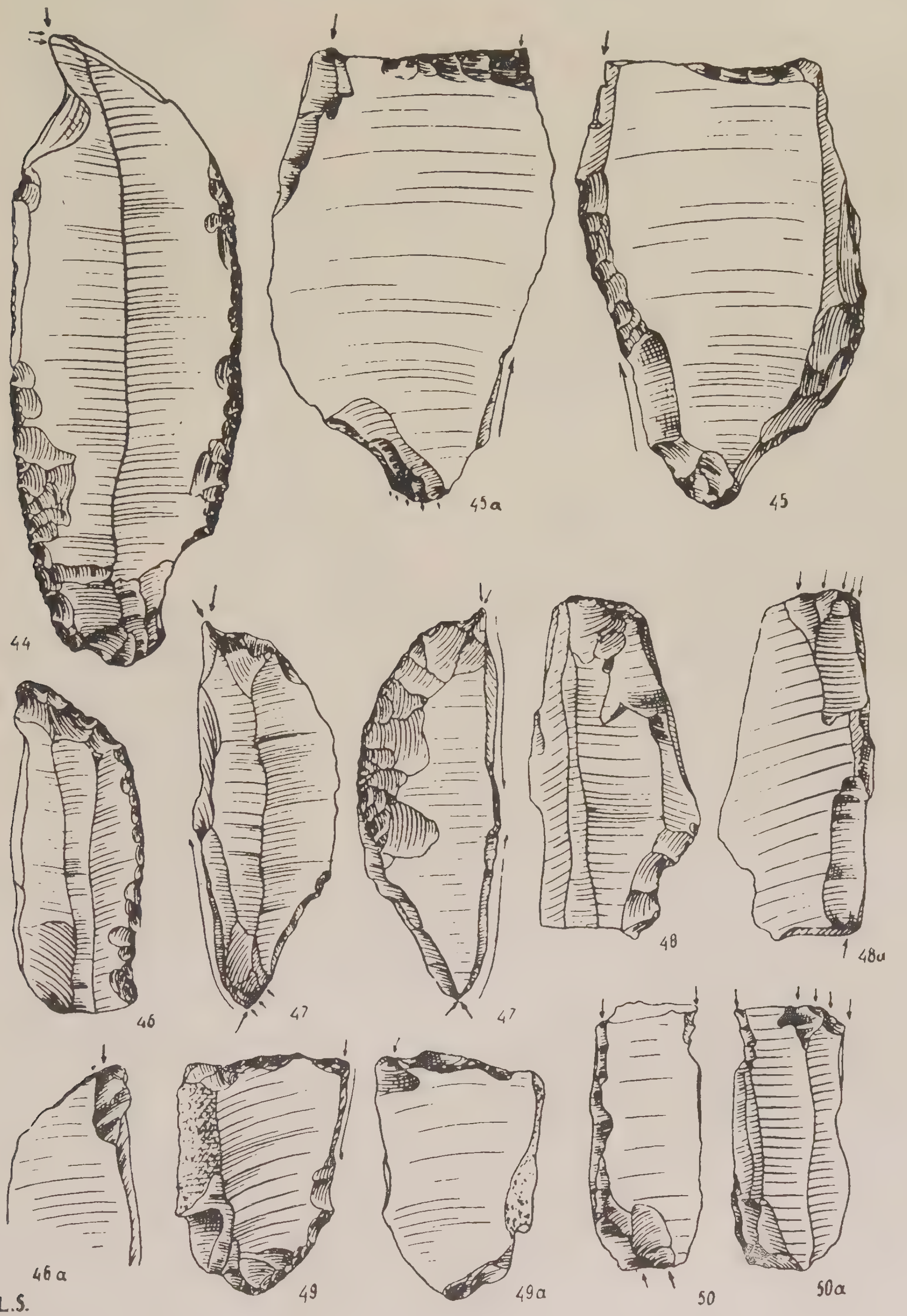
L.S.

FIG. 42. Stone Industry of Kostenki I. Kielsiev's Excavations. After L. Sawicki.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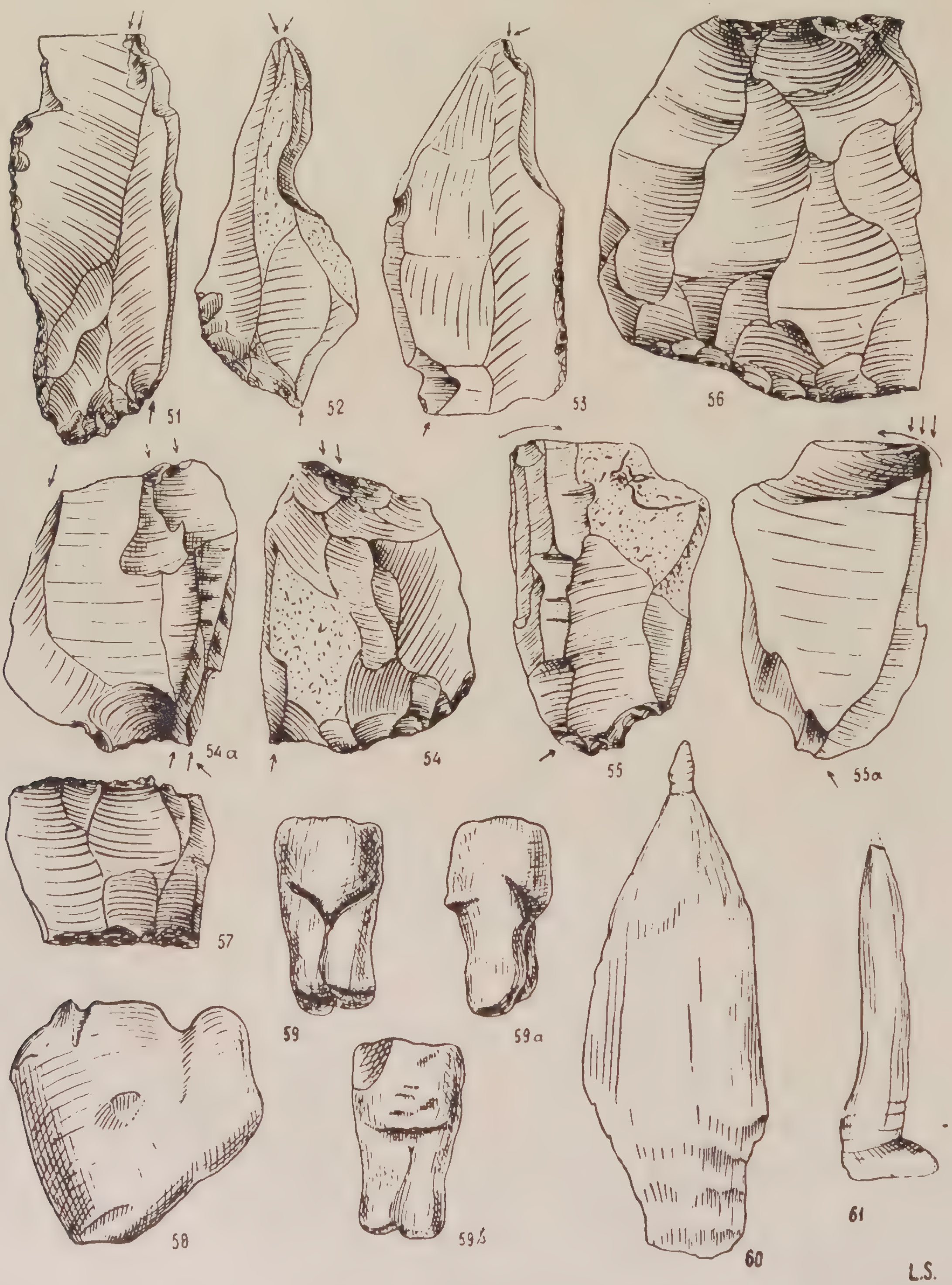
50a
L.S.

FIG. 43. Stone Industry of Kostenki I. Kielsiev's Excavations. After L. Sawicki.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54 a
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55a
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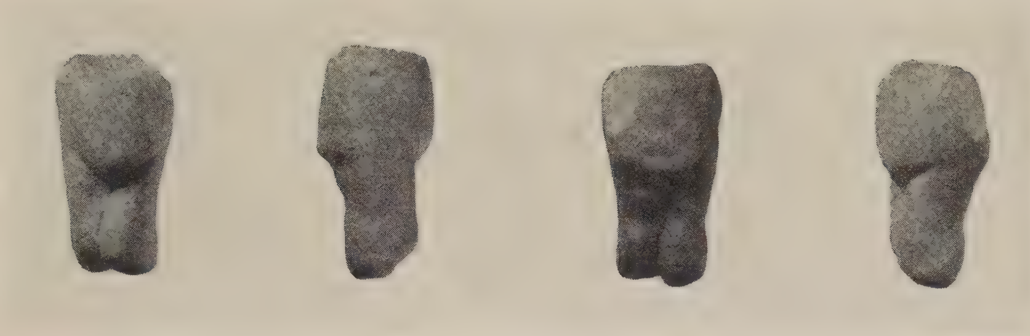
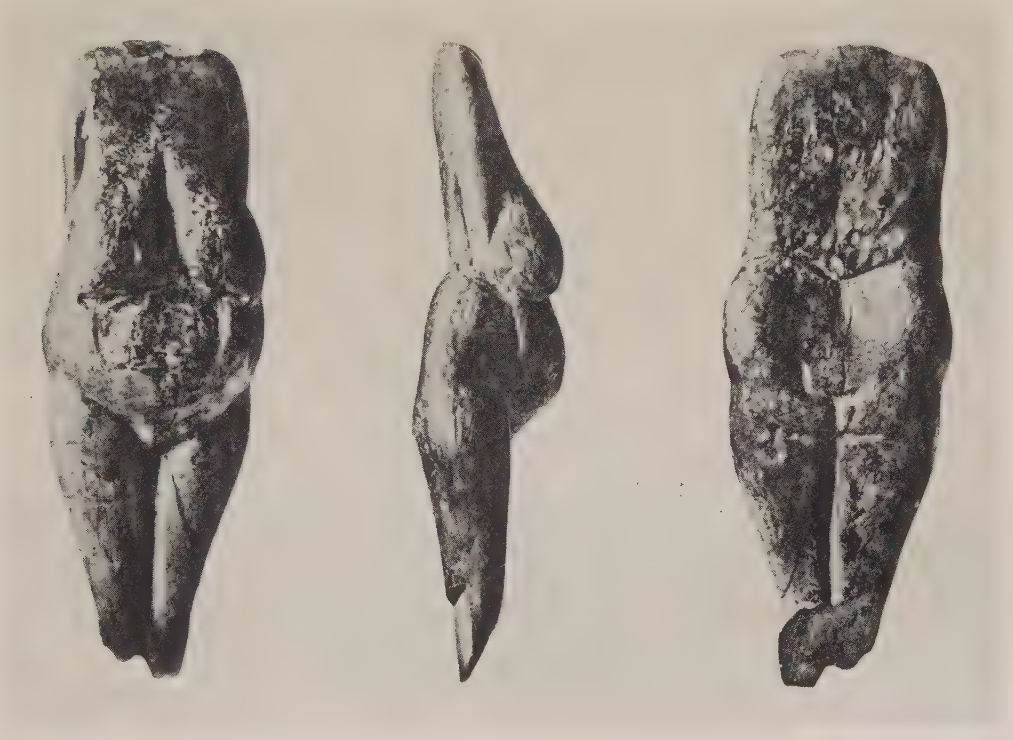
59
59a
58
59 б
60
61
L.S.

FIG. 44. Stone and Bone Industry of Kostenki I. Nos. 51–57 of Kielsiev's Excavations; Nos. 58–61 of P. P. Ephimenko. After L. Sawicki.



a. KOSTENKI I. FRAGMENT OF STONE (MERGEL) FEMALE FIGURINE FOUND BY KRUKOVSKY. Photo from the cast by the author. 1/1.



b. KOSTENKI I. IVORY FEMALE FIGURINE FOUND BY P. P. EPHIMENKO IN 1923. 1/1. After Ephimenko.

According to Zamiatnin,[1] the material for the stone industry of Krukovsky's excavations is dark, almost black, flint, found at present in the nearby chalk outcrops. It is covered by light blue patination. Chips of brown ferrous flint are rare. The tools were manufactured on the spot, as evidenced by the number of chips. Zamiatnin points out among other forms large knives of Magdalenian type, scrapers, small points, very fine points of Solutrean type with a notch in the lower part, and "even some typical Aurignacian tools such as high scrapers."

There are also small prismatic flakes with three or four facets retouched on one side. Contrary to the assertion of R. Schmidt who calls them "*petites pointes*," "*Borsteinspitzen*," or "*lames à dos rabattu*" they are not finished tools. Even though some of them may have been utilized, they were simply the results of manufacturing gravers. In order to obtain a massive point, a long splinter was detached from the side of a blade by a longitudinal, slightly oblique, blow (*coup de burin*). What appears to be retouch on these splinters is a part of the retouch of the mother blade, made not only on the end but also on the side in order to obtain a more regular facet. Similar flakes were observed in Mezine.

Bone Industry.—Among the charred and purposely split bones of a mammoth, there was found a jaw with scratches and cuts, made by stone knives or scrapers, in the removal of the flesh.

Female Figurines.—Of special interest is the find of a small statuette made of "*mergel*" [2] (Plate XX, *a*), representing a nude female.[3] The upper part including head and thorax is not preserved. The legs are present only as far as the knees which are slightly bent, and the protruding abdomen sags down to the well-pronounced pubic triangle.

Excavations of Ephimenko and Zamiatnin, 1923, 1926, 1931.—For a period of seven years no further work was done in Kostenki. Then, in 1922, S. N. Zamiatnin, who at that time was Curator of the Archaeological Section of the Voronezh Museum, made a few trial excavations while working in the Borshevo site. Finally, in the summer of 1923, very large excavations were made by P. P. Ephimenko with S. N. Zamiatnin at Kostenki I and Borshevo I. Ephimenko continued these in 1926 and 1931.

The trench made by the investigators on the spot of Kostenki I (Pokrovsky Gully) gave very interesting results. Near the former excavations of Krukovsky, there was found the border line of the cultural layer, which consisted of loam and contained many flint implements. Nearer to what was perhaps the center of a "hearth," the excavations revealed more and more interesting finds. On the floor of the square pit, 0.5 m. deep, which widened toward the bottom and was undoubtedly purposely dug out by Palaeolithic man, were found mammoth tusks and the ribs of smaller animals.

Ephimenko [4] states that these bones were stored as material for manufacturing bone tools, and include the tips of mammoth tusks, several horse ribs, some showing traces of breakage at the cut. Beside these were found elongated tools made of longitudinally split horse ribs with spatulated ends, so-called "smoothers." There was also a small point or awl of mammoth ivory, round in cross-section.

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[1] Zamiatnin, S. N., "Notes on the Prehistory of Voronezh Region," Voronezh, 1922, p. 6.

[2] Marly limestone.

[3] This is really the first sculptured representation of woman found in Russia as Mezine statuettes are variously interpreted. (E. G.)

[4] Ephimenko, P. P., "Pre-Clan Society," Leningrad, p. 357, 1936.

The most interesting object was an ivory female figurine, of very fine workmanship (Plate XX, *C*). "This statuette," writes Ephimenko, "executed very artistically, permits us for the first time to link Russian finds with the series of pre-Magdalenian statuettes of Western Europe. It is 9.05 cm. long; the head is lost, having evidently been broken before its discovery. The legs end just below the knees and taper down to a point. This is often the case in similar figurines, perhaps for the purpose of fixing them on a stand or simply on the ground. The figure is represented in full length and treated very formally. As is seen from the photograph, the physical type is represented realistically. The large, pear-shaped breasts and enlarged abdomen suggest the over-development of the fatty tissues. However, the statuette has no steatopygy, thus differing from Mentone, Brassempouy, Willendorf and others. At the same time there is a certain slimness, with the thin arms delineated along the sides of the body and folded on the abdomen; the narrow thighs with a wide pelvis, the definitely indicated umbilicus and a line down the back, give the characteristic lines of a corpulent body." [1]

Slightly above the breasts there is a thin engraved triple line with oblique notches, which according to Ephimenko,[2] represent a ribbon or decoration. He considers that this statuette represents a different physical type from Willendorf, being less corpulent.

The later investigations of P. P. Ephimenko in 1923, 1926, and 1931 [3] yielded new and very important facts indicating the existence here of a very developed bone industry, objects of art, and traces of habitations in the shape of hearth pits, etc.

No complete description of the excavations of 1923, 1926, and 1931 has appeared as yet. However, the results of the 1931 season were especially interesting. According to Ephimenko, Kostenki I was a very large hunting camp. In 1931, an area of 145 sq. meters was excavated, and almost all of it was occupied by a large "dwelling" not less than 15 meters long. The extent of it could easily be determined by a more or less thick layer of kitchen refuse, consisting of broken bones of animals, charcoal, worked flint, etc. A considerable portion of this layer had a pronounced red color due to the presence of ochre. In spots where the pits were located, this layer reached a thickness of 40–50 cm.

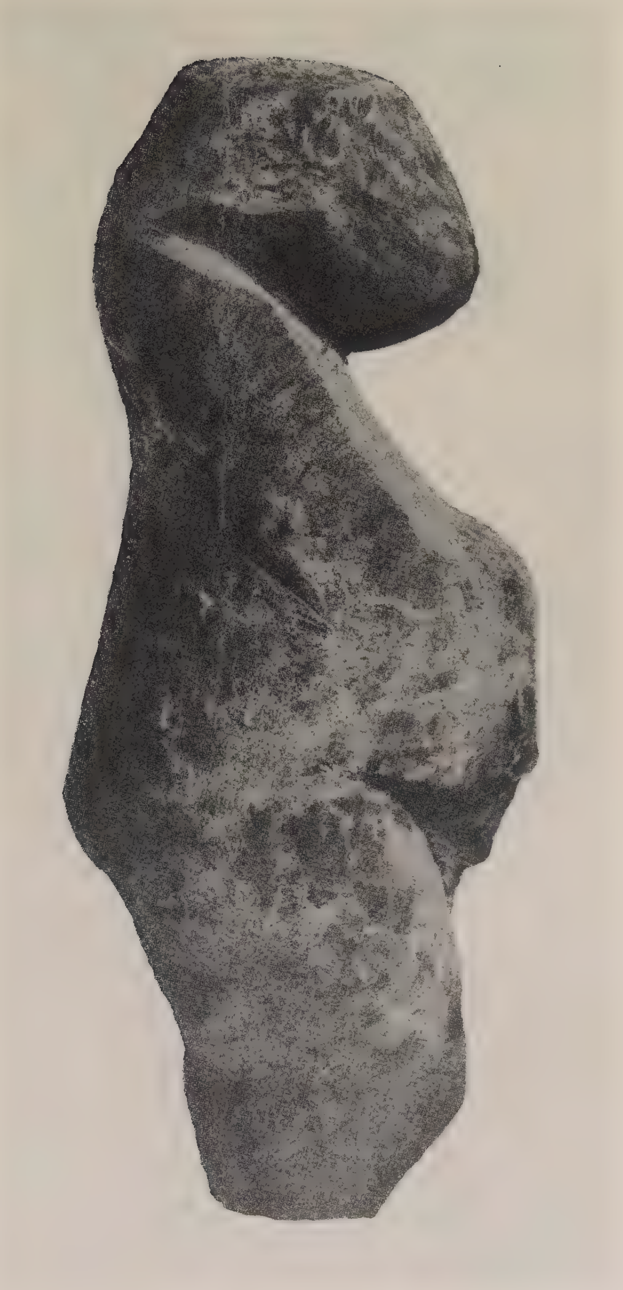
Ephimenko distinguished two cultural complexes here, though not very sharply delineated, consisting of large depressions in the loess, oval in form with the long diameter up to six meters, the bottom being 40 cm. below the surface of the floor of the "dwelling." In both groups were found several hearths of regular round form, the walls of which were burned red, and in one case a trace of "shoulder" was preserved. These hearths were filled with a thick layer of charred bones, thus confirming according to the investigator, the theory that the accumulations of mammoth bones, so usual in Russian Palaeolithic sites constituted the supplies of fuel.

A number of various depressions and pits dug out in the floor, were used as storage pits and for other domestic purposes. There were several holes for posts supporting the roof, similar to those found by Bayer in Lang-Mannersdorf.

[1] Ephimenko, P. P., "The Statuette of Solutrean Epoch," Materials for the Ethnography of Russia, The State Russian Museum, Vol. 3, Pt. I, 1926, pp. 139–142.

[2] Ephimenko, P. P., "The Statuette of Solutrean Epoch," Materials for the Ethnography of Russia, The State Russian Museum, Vol. 3, Pt. I, 1926; also in "Pre-Clan Society," 1936, p. 315.

[3] Ephimenko, P. P., "Pre-Clan Society," Leningrad, 1936, p. 352. Also: "Kostenki I," Soobschenia of the State Academy for the History of Material Culture, 1931, no. 11–12, pp. 59–60.



Kostenki I. Large Female Figurine of Soft Stone, Found by P. P. Ephimenko in 1931. After P. P. Ephimenko.

Some pits were larger towards the bottom. Ephimenko interprets them as primitive ovens for the roasting of enormous pieces of meat; others may have been used as storage pits.

Next to the fireplace, in the northwestern corner of the dwelling, he has discovered a niche-like, round pit, 0.80 meters wide, 0.50 meters high, and 1 meter deep.[1] In the process of clearing, it became evident that it did not contain any refuse, thus differing from the storage pits. On the bottom of it were found several interesting objects, figurines, etc.

Female Figurines.—At the entrance to this niche Ephimenko found a large ivory statuette representing a nude female (Fig. 45). It was in a poorer state of preservation than the one found in 1923, yet it presents some very interesting details. There is an engraving, representing a necklace, which hangs down the shoulders and breasts. The head is missing, but on the upper part of the back where it joins the neck, traces of series of small elevations may be observed. These show that originally there was a cap or hairdress like those of Willendorf, Gagarino and others.

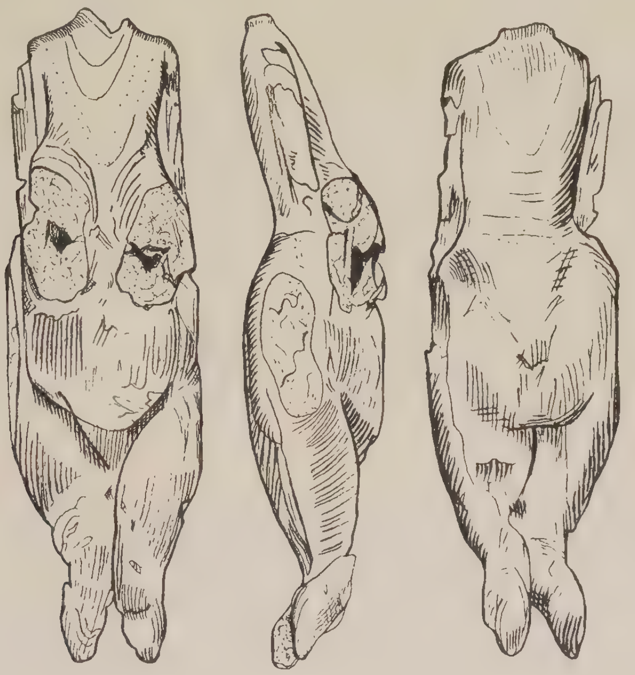


FIG. 45. Large Female Figurine of Mammoth Ivory Found in Kostenki I. 3/4 natural size. Excavation of P. P. Ephimenko after Ephimenko.

Next to this statuette, there was found another one, broken in four pieces. It was made of stone, much larger, some 15 cm. in height, very massive, and carved in rather schematic fashion (Plate XXI). On the whole it gives the impression of a very primitive looking creature. When viewed in profile, the thick neck and protruding supraorbital ridges give the impression of a reconstruction of Neanderthal Man. Ephimenko[2] compares it with the stone statues[3] of South Russia.

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[1] According to Ephimenko it is 1.60 meters. "Kostenki I," Soobschenia of the State Academy for the History of Material Culture, 1931, nos. 11–12, pp. 59–60.

[2] Ephimenko, P. P., "Pre-Clan Society," Leningrad, 1936, p. 315.

[3] So called "Babas." (E. G.)

By the side of the last figurine was found an object carved out of mammoth tusk, in the shape of a handle, terminating in a round spherical head. This is, perhaps, a rough and schematic representation of a human being. Ephimenko speaks of a number of fragments, heads, parts of torsos, and several small female figurines made of soft stone, one of which is decorated on the back by a series of vertical lines like those of the Lespugue statuette. A sandstone slab with an engraved representation of a nude female was found in another depression dug out in the floor. During the same season a number of pendants and different figurines were discovered, one of which is made of stone and represents a mammoth, showing a well defined head and legs. In this respect, it is similar to the one found at Predmost. Among other examples of bone work, Ephimenko [1] speaks of a well preserved *baton de commandement* of reindeer horn found in 1931 and of a large tool with a pointed end made of mammoth tusk which he calls a digging tool (Fig. 44). According to a Russian newspaper report, some forty-two bone and stone carvings were found, but as yet no complete list has been published.[2]

Dating.—The Aurignacean-Solutrean of Ephimenko (proto-Solutrean of some authors) or Eastern phase of Solutrean seems to be the acceptable dating of Kostenki I.

5. GAGARINO

The site of Gagarino [3] was discovered in 1928 by S. N. Zamiatnin in the village of Gagarino, formerly of Lipetsk district Tambov Region, on the river terrace of the Don.

According to Ephimenko, the cultural deposit discovered here was concentrated on a small area, under the humus, in a layer of loess-like loam and has the appearance of a flat lense, 4.50–5.50 meters in diameter, oval in form.

The area of cultural remains has sharply outlined borders, beyond which the finds disappear, except for a small quantity of pieces of flint and bone, probably brought there by small rodents. On the periphery of this accumulation were rows of slabs of local Devonian limestone, some partly remaining in their original vertical position. The thickness of the cultural layer averaged 0.40–0.50 meters, and, as is usually the case with the Russian sites of the Upper Palaeolithic period, the cultural layer has a rose shade, due to a considerable admixture of ochreous pigment, mostly marked in the lowest part (0.08–0.12 meters) around the lower edge of the stratum.

This "hearth," which in every detail is similar to one which is described by Ducrost

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[1] Ephimenko, P. P., "Pre-Clan Society," Leningrad, 1936, p. 248.

[2] According to Field, H., and Prostov, E. ("Recent Archaeological Investigations in the Soviet Union," A. A., Vol. 38, No. 2, pp. 285), "Two ancient dugouts were disclosed in Kostenki I. Besides flint implements and bones of *domestic* animals, stores of minerals used possibly for dyeing were found. Fragmentary female figures of marl, also those of animals, probably connected with totemic beliefs, came to light. A mammoth, the head of a cave lion, a bear, and a *camel* could be identified. This is first discovery of a camel effigy reported from a Palaeolithic site." The domestic animals and camel's effigy are most puzzling finds. (E. G.)

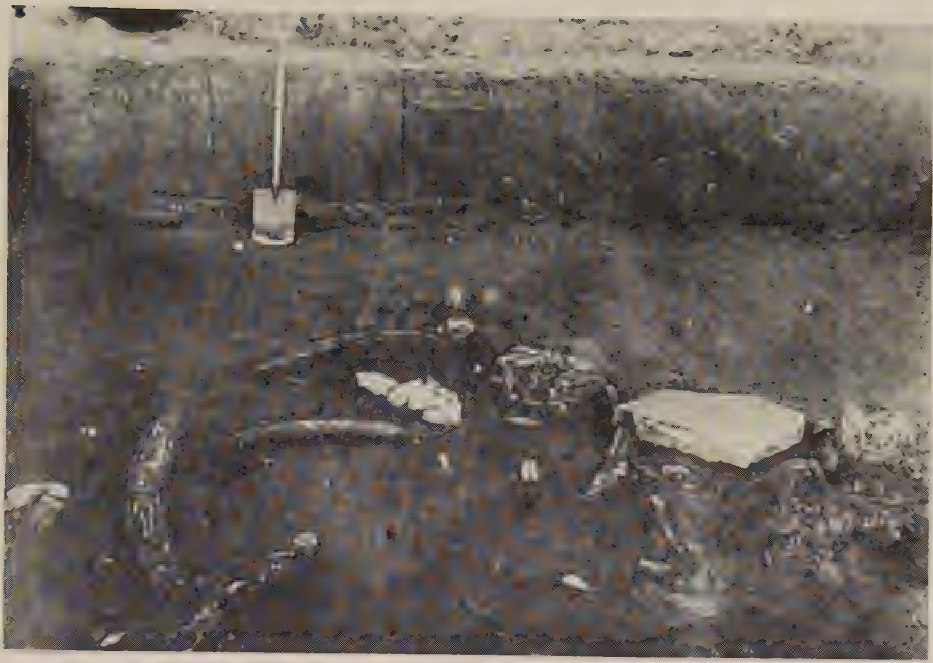
[3] Ephimenko, P. P., "Pre-Clan Society," Leningrad, 1936, pp. 291–293.

Gorodzov, V., "The Results of Archaeological Activities in U.S.S.R. during 1917–1930." Manuscript.

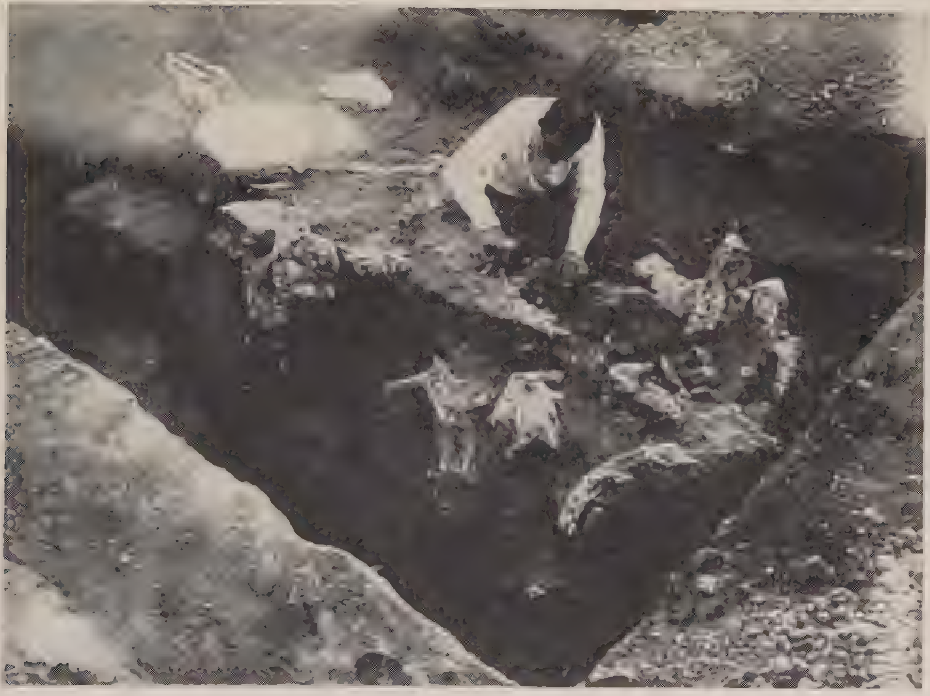
Golomshtok, E. A., "Trois Gisements Paléolithique Supérieur, en Russe et Sibérien," L'Anthropologie, T. XLIII, 1933.

Zamiatnin, S. N., "Gagarino," GAIMK, 1935, not available to me, review in Antiquity, June, 1936, pp. 242–245.

PLATE XXII



a. Remains of Dwelling. Before Cleaning.



b. Remains of Dwelling. After Cleaning. Photograph of S. Zamiatnin

in Solutré, represents, in the opinion of P. P. Ephimenko, the remains of a dwelling.[1] He believes that "in the majority of the open stations of the Aurignacian-Solutrean period there are indications of the existence of massive permanent huts, of the type of semi-subterranean dwellings of tribes of the polar regions. They are found in Timonovka (Central Russia), in Predmost (Moravia), where one was incorrectly called a 'common grave' in Lang-Mannersdorf (Lower Austria), in Solutré, in Fourneau du Diable, etc." He further states that "besides the sites, where the walls of the foundations dug out in the ground were in most cases strengthened by stone slabs or mammoth bones and, therefore, could be easily detected, there are in Eastern Europe many stations, where the walls of dwellings were also dug out of the ground but strengthened with wood. These often pass as "hearths," and usually have the appearance of large spots, generally oval in shape, sharply outlined, and abundant in refuse." [2]

Fauna.—According to Gromov [3] the remains of the following animals were found:

1.	*Elephas primigenius*	many.
2.	*Rhinoceros tichorhinus*	few.
3.	*Bos* (sp.)	very few.
4.	*Vulpes vulpes*	
5.	*Alopex lagopus*	many.

Dwellings.—We have a similar condition in Gagarino, where S. N. Zamiatnin discovered the lower part of a habitation in the shape of a shallow pit, the walls being strengthened with a row of stones (Fig. 46). A considerable quantity of large animal bones, the long bones of rhinoceros and mammoth and the tusks and lower jaws of the latter, were encountered on the periphery of the cultural layer and were probably used for the same purpose as in Predmost (Plate XXII). The wooden part of the structure, of course, was not preserved. Zamiatnin does not mention the hole for the central post supporting the roof because this pole was situated in the center of the hut; when some domestic repairs were made on the farm where this station is situated, this part of the deposit was destroyed previous to the excavation.

Thus, this construction of stones (Plate XXIII), evidently the foundation and walls of the hut, gives us the possibility of forming an idea of the type of dwellings used by Palaeolithic man when he could not use caves and natural shelters.

The space inside the pit was filled with all sorts of remains of habitation, small fragments of bone, charred bones, pieces of red ochre, flint flakes, and a considerable quantity of flint and bone implements. Altogether Zamiatnin found six hundred flint tools there, more than one thousand flakes, and a large quantity of remains of flint manufacturing.

Among the bones bearing the marks of industry, Zamiatnin found pieces of mammoth tusk in preparatory stages of manufacture, bones with traces of work, dart points, awls, needles, needle cases, pendants carved out of mammoth tusk, perforated teeth of arctic fox, and, finally, seven figurines made of mammoth tusk (Fig. 46, Plates XXIV, XXV).

Two figurines were found intact, a third well preserved, except for the loss of its legs, three others only in fragments and a seventh in unfinished form. They are small, and all evidently represent females. Two of them (one whole and one with broken legs) have much in common with the famous Willendorf statuette of Upper Austria, except for the treatment of the arms. The thin arms of Willendorf are placed on the breasts, while in one of the Gagarino figurines the arms are at the sides, and in the second they are stretched forward, the palms opened and joined in such a way as to suggest a praying attitude, which gives it an unusual aspect.[1] It is interesting to note that the second whole statuette represents a

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[1] In the shape of a shallow pit with walls strengthened by stones. (E. G.)

[2] P. P. Ephimenko, "Female Statuettes of Aurignacian and Solutrean epochs," Soobschenia of the State Academy for the History of Material Culture, pp. 4–5, July, 1931.

[3] Gromov, V. I., "Geology and Fauna of the Palaeolithic Period in U. S. S. R.," Problems of the History of Material Culture, No. 1–2, Leningrad, 1933.

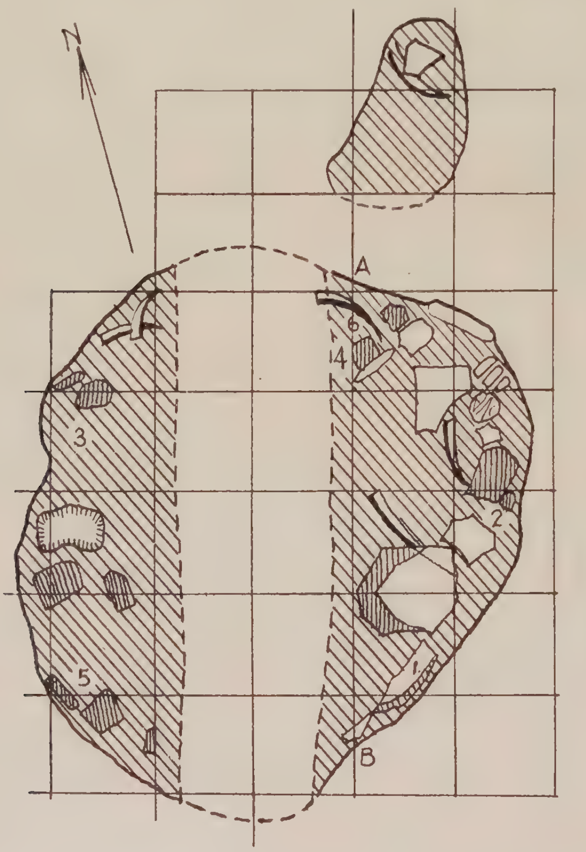

FIG. 46. The Ground Plan of the "House Complex" in Gagarino. 1–6, the position of the statuettes. *A–B*, sectionline.

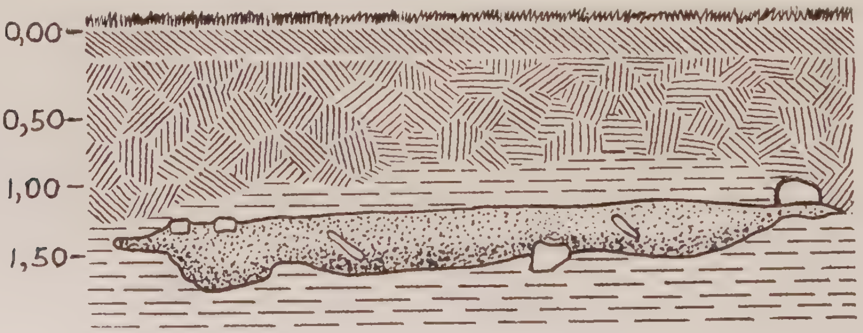

FIG. 46*a*. The Section Along the *A–B* Line of the "House Complex" in Gagarino. After P. P. Ephimenko, "Pre-Clan Society," Fig. 89*a*, 89*b*.

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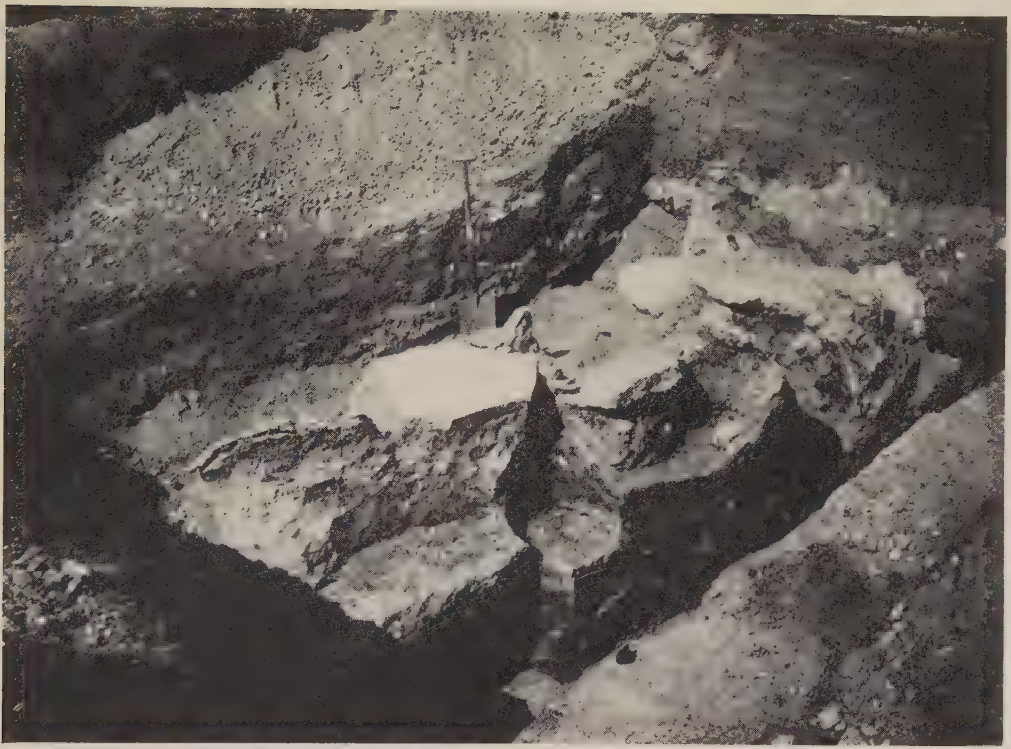
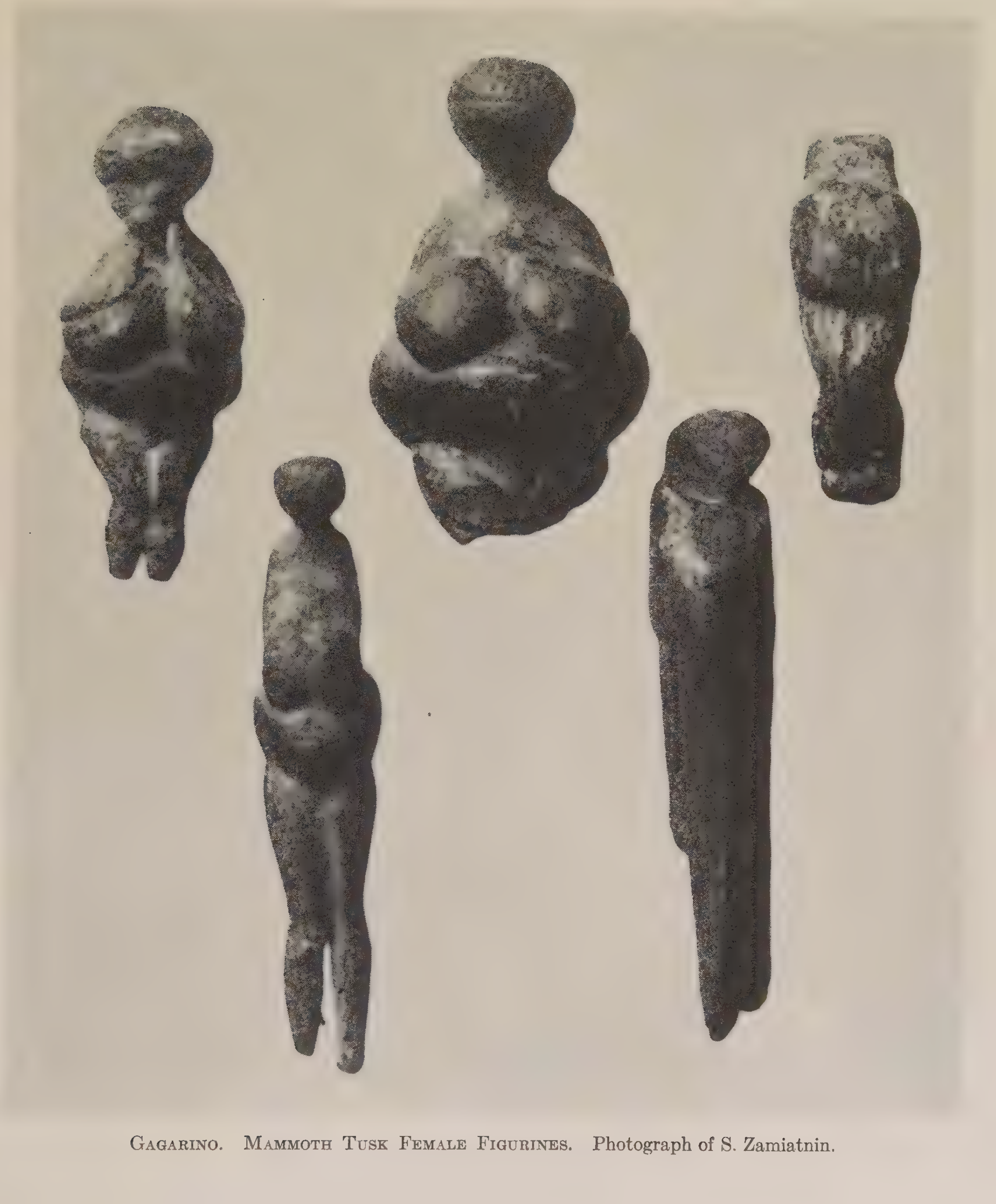
[1] Compare with the bas-relief of Laussel, France. (E. G.)

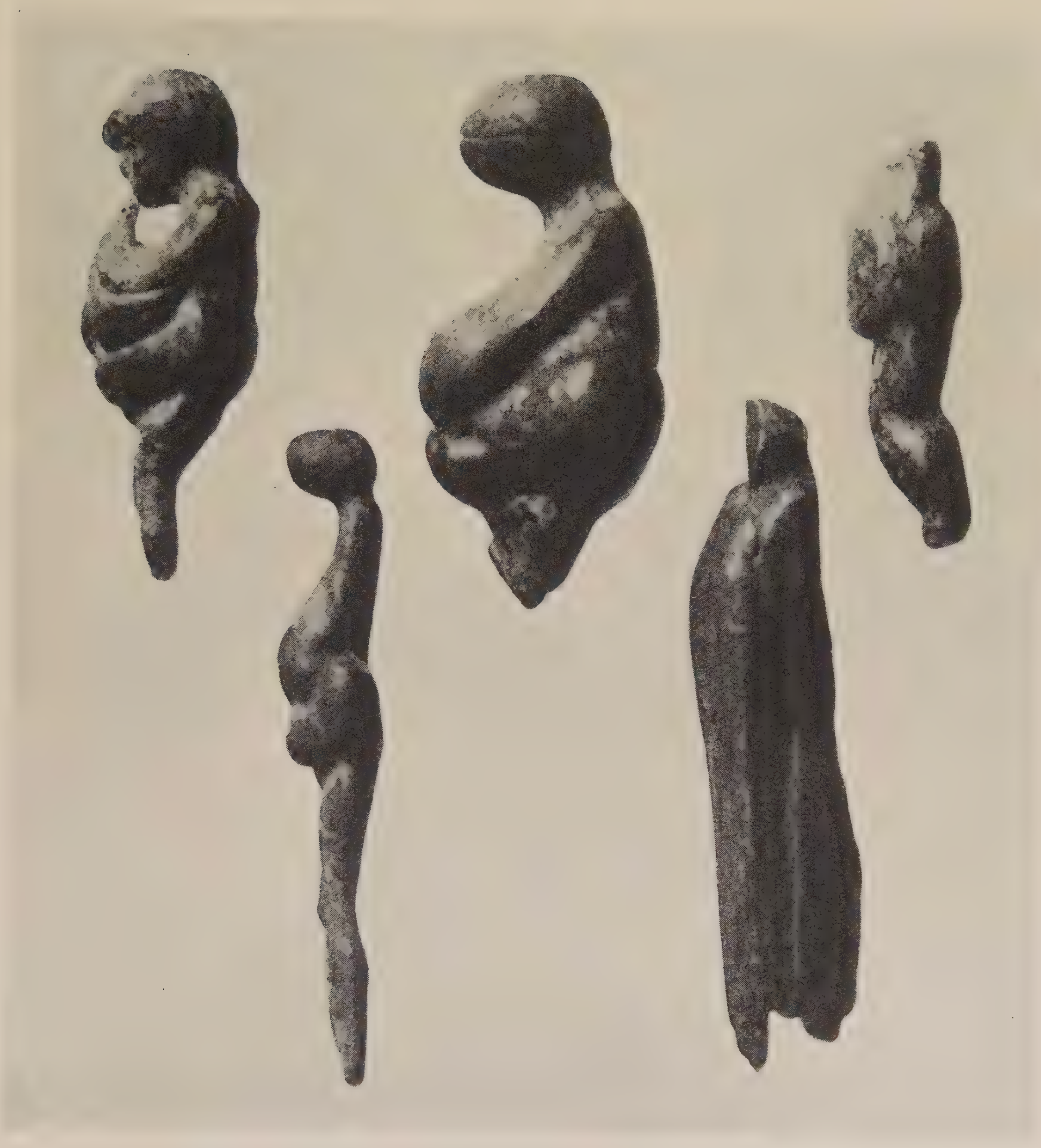
PLATE XXIII.



The Stone Foundation at Dwelling. Photograph of S. Zamiatnin.



Gagarino. Mammoth Tusk Female Figurines. Photograph of S. Zamiatnin.



Gagarino. Mammoth Tusk Female Figurines. Photograph of S. Zamiatnin.

thinner woman and thus differs from the corpulent one of Willendorf, but has its arms placed similarly on its breasts.

These sculptures, representing figures of nude women, find their nearest analogies in the statuettes of Willendorf, Mentone, Brassempouy, and the bas-relief of Laussel (Dordogne) and represent the most ancient sculptured remains that have reached us. The first find of this sort in the U. S. S. R. was made in 1923, in Kostenki, by P. P. Ephimenko, greatly widening area of distribution of Aurignacian sculptures. Still a number of characteristics connect the Gagarino statuettes with the Venus of Willendorf, rather than with that of Kostenki, thus making them somewhat older than the former though belonging to the same general chronological period. This is also confirmed by the character of the rich flint industry of Gagarino, which is not so stabilized and has not so settled an aspect as the industry of Kostenki I.

It is interesting to note that all the statuettes of Gagarino were found along the walls of the hut, whereas the other cultural remains were found more or less scattered evenly on the floor. In one case only, was there found a cache of flint and bone objects in a little depression in the floor.

The time of the Gagarino site is determined fairly accurately by the whole complex of finds, especially by the characteristic flint points with a lateral notch, and the beginning of the Solutrean retouch, encountered also in Kostenki I and the upper layer of Willendorf, where female statuettes were also found. The remains of this remarkable palaeolithic station are preserved in the Museum of Anthropology and Ethnology of the Academy of Sciences of U. S. S. R.[1]

According to Gorodzov, the leading forms from the point of view of dating are high scrapers (*grattoir caréné*) and crooked gravers (*burins busqué*), which in his opinion, place this station in the Aurignacian period.

Gagarino, by its importance, will undoubtedly occupy one of the first places among the Upper Palaeolithic stations of Eastern Europe.

6. Berdizh

This site was discovered in 1926 by K. M. Polikarpovich [2] near the village of Berdizh, near Chechersk district, Gomel region, and represents the first find of a Palaeolithic culture in the territory of Bielorussia. (See map, Fig. 47.) This discovery was made during a systematic survey of Neolithic sites in the valley of the Sozh River. Preliminary excavations by Polikarpovitch yielded a large quantity of fossil bones most of which were those of mammoths. Over seventy fragments were found in an area of eleven square meters, together with flints of undoubtedly human workmanship and fragments of charred bone.

In 1927, the State Academy of the History of Material Culture sent Mr. S. N. Zamiatnin, who, under the auspices of the Institute of Bielorussian Culture, conducted excavations in which K. M. Polikarpovich, S. A. Dubinsky, and others participated. The geological conditions of the site were studied by a Professor of the Moscow State University, G. F.

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[1] Ephimenko, P. P. ("Pre-Clan Society," Leningrad, 1936), on the basis of similarity of sculpture, the presence of *pointe à cran atypique*, and the beginning of Solutrean bifacial retouch, places it in the final Aurignacian or early Solutrean times (Proto-Solutrean?).

[2] Polikarpovich, K. M., "Prehistoric Sites of the Middle and Lower Part of the Sozh River," Pratzi of the Archaeological Committee of the Institute of Bielorussian Culture, Vol. I, Minsk, 1928, pp. 156–158.

Mirchink,[1] who has given a definite geological dating of the site, on the basis of the stratigraphy.

During the three weeks of excavation a total area of sixty square meters was opened. An account of the excavation was published by S. N. Zamiatnin,[2] a more or less complete summary and translation of which is given below.

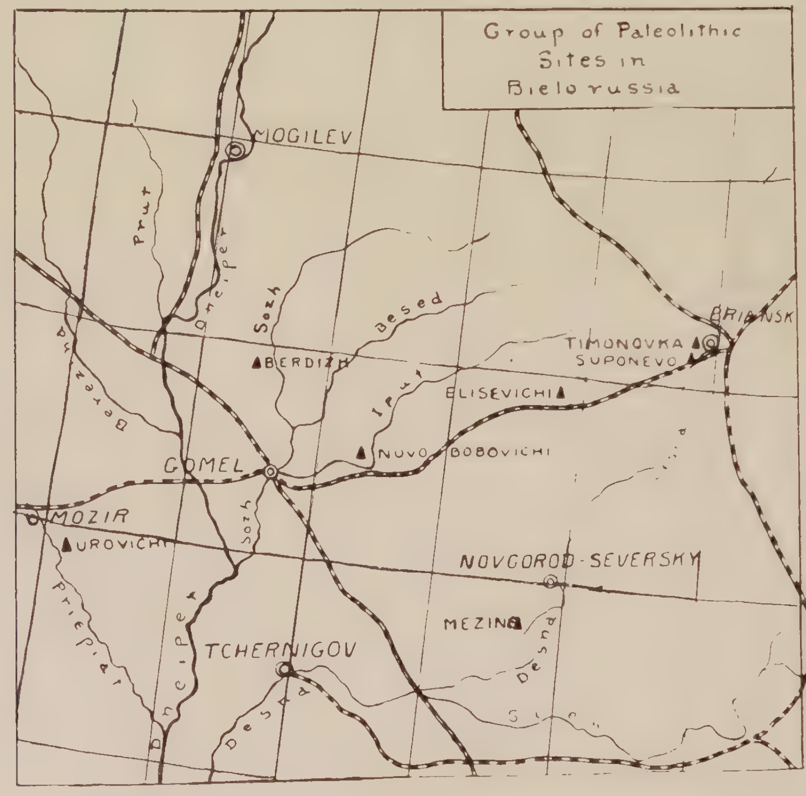
Group of Paleolithic Sites in Bielorussia
MOGILEV
Prut
Dnieper
Sozh
Besed
BERDIZH
BRIANSK
TIMONOVKA
SUPONEVO
ELISEVICHI
Iput
Berezina
GOMEL
NOVO BOBOVICHI
MOZIR
UROVICHI
Sozh
Pripiat
NOVGOROD-SEVERSKY
MEZIN
Desna
TCHERNIGOV
Dnieper
Desna

Fig. 47.

Location.—The Palaeolithic site of Berdizh is situated on the bank of the Sozh River about 1.5 km., S–SW., of the village of Berdizh, in the Kalodezhki Valley. (See map, Fig. 47.) The cultural remains were discovered by Polikarpovich on the hill which rises 3.5 meters above the Sozh (Plate XXVI, *a*).

Later investigation showed that the cultural remains are found at the mouth of an old gully, which is in the southern end of the Sozh valley. Zamiatnin's work began with the trial pit in 1926 (no. 1) where it was determined that the bone layer spreads inward from the shore. Another pit (no. 2) 5 x 6 meters was dug due west from the first one.

The unusual looseness of the upper sandy layers and the rainy weather made it necessary to dig the walls of the pits in an oblique manner to avoid their collapse. For this reason, the exposed cultural area of pit No. 2 was only 5.5 x 3.4 meters, or less than twenty square meters. (See plan, Fig. 48.)

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[1] Mirchink, G. F., "The Geological Condition of the Palaeolithic Site of Berdizh on the River Sozh," The Pratzi of the Archaeological Committee of the Bielorussian Academy of Sciences, Vol. II, Minsk, 1930.

[2] Zamiatnin, S. N., "The Excavation of the Palaeolithic Site of Berdizh in 1927," Pratzi of the Archaeological Committee of the Bielorussian Academy of Sciences, Vol. II, Minsk, 1930, pp. 479–490.

a. Berdizh. General View at Excavations.

b. Berdizh. Cross Section, Showing Foliation of Sands. Photograph of S. Zamiatnin.

Geology.—The stratigraphy of the site appears to be as follows:

- A. A turf layer.
- B. Dark-gray, fine grained sand, colored by the humus.
- C. Light gray, uniform, fine grained sand with streaks of the ortsand.
- D. Foliated white fine grained sand in spirals and convolutions.
- E. Greenish-gray loam with streaks of sand and gravel, containing the cultural remains, 35–60 cm. thick.
- F. Coarse-grained, horizontally foliated sand with gravel (Plate XXVI, *b*).

The cultural layer E has a sharp incline southward toward the shore of the Sozh, and westward toward the gully, so that one end of the excavated area was 2.9 m. from the surface and the other 4.4 m. In pit no. 2 the cultural layer was 3–4 m. above the water level.

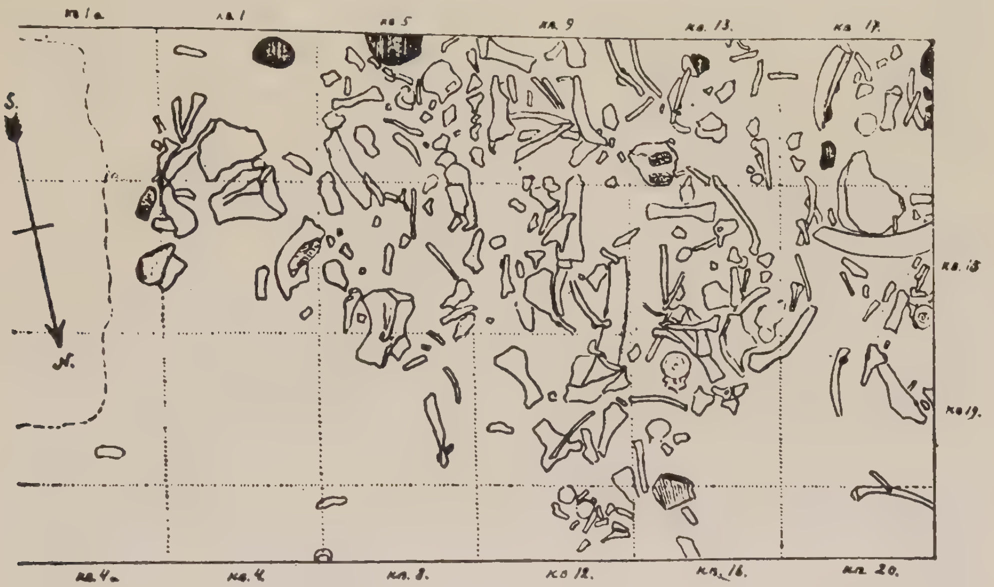

FIG. 48. Berdizh. Plan of the Excavated Area of Pit No. 2 in Berdizh, Showing Square Numbers. After S. Zamiatnin.

The investigations showed that the cultural remains in the excavated area were not evenly distributed. They increase in the southwest part of the pit, almost disappearing in the southeast part. The trial pit, no. 3, which was sunk two meters south of pit no. 2, proved to be sterile, thus confirming this observation. Consequently all material obtained came from pit no. 2.

Fauna.—The cultural layer was found to be literally filled with animal bones which were piled up, without any apparent order, in a small area (Plate XXVII). The exact boundary of this area, which extended in a westerly direction, could not be determined. Zamiatnin definitely feels that this group of bones was found *in situ*, as they were concentrated in a small area of eleven square meters, often lying one on top of the other despite the considerable slope of the shore.

This concentration and the absence of the bones beyond the border of this area indicate, in the opinion of the excavator, that these bones were piled here by prehistoric man for some definite purpose. He states that this condition could not exist if the bones had been moved about to any extent, for in this latter case both their quantity and size would decrease from the center of the pile down the slope.

Most of the bones found were those of mammoths. V. I. Gromov [1] indicates the remains of sixteen individual animals and established the presence of the following fauna: [2]

1. *Elephas primigenius*,
*2. *Elephas primigenius minor*,
*3. *Sus scrofa ferus*,
4. *Equus equus*,
5. *Bos* sp.,
*6. *Cervus elaphus*,
*7. *Rangifer tarandus*,
*8. *Canis lupus*,
9. *Canis canis* sp.,
10. *Alopex lagopus*,
11. *Ursus* aff. *spelaeus*,
12. *Citellus* sp.

A small quantity of charred bone was found after clearing the bone pile.

Flint Industry.—A large quantity of flints, consisting mostly of whole nuclei, chips, and flakes, was found in the bone layer. Only twenty-five could be unmistakably recognized as being produced by man. These were either finished implements or flakes resulting from their manufacture.

All of these were found in the southern and western part of the pit. (Squares 1, 5, 9, 13, 17, 18, and 20. See plan, Fig. 48). Large pieces of flint and pebbles were also found in these sections of the pit.

Material for the stone industry was furnished by the local flint of chalk origin, often found in the neighborhood in secondary deposition on the surface or as an outcrop in the chalk near by.[3] The flint is dark gray in color, of slight transparency, and has many incrustations, which differ from the basic color.[4] The nodules have a white crust on the surface. The patina is absent on most of the flints.

The finished tools of Berdizh equal in number the chips and flakes found. Zamiatnin stresses the special care taken in excavation, in which he endeavored to collect every bit of stone. On the face of it he believes that the actual manufacturing of the tools was not done in the excavated portion of the site but elsewhere.

As the total number of flints found in Berdizh is very small, it was thought advisable to cite almost verbatim Zamiatnin's description, given by squares. He describes the following artifacts:

Pit No. 2.

Square 1.—1. A small point (Fig. 49, no. 3*a*, *b*) with side notch (*pointe à cran atypique*), of dark-gray flint without patination, the upper end of which had been broken. The length

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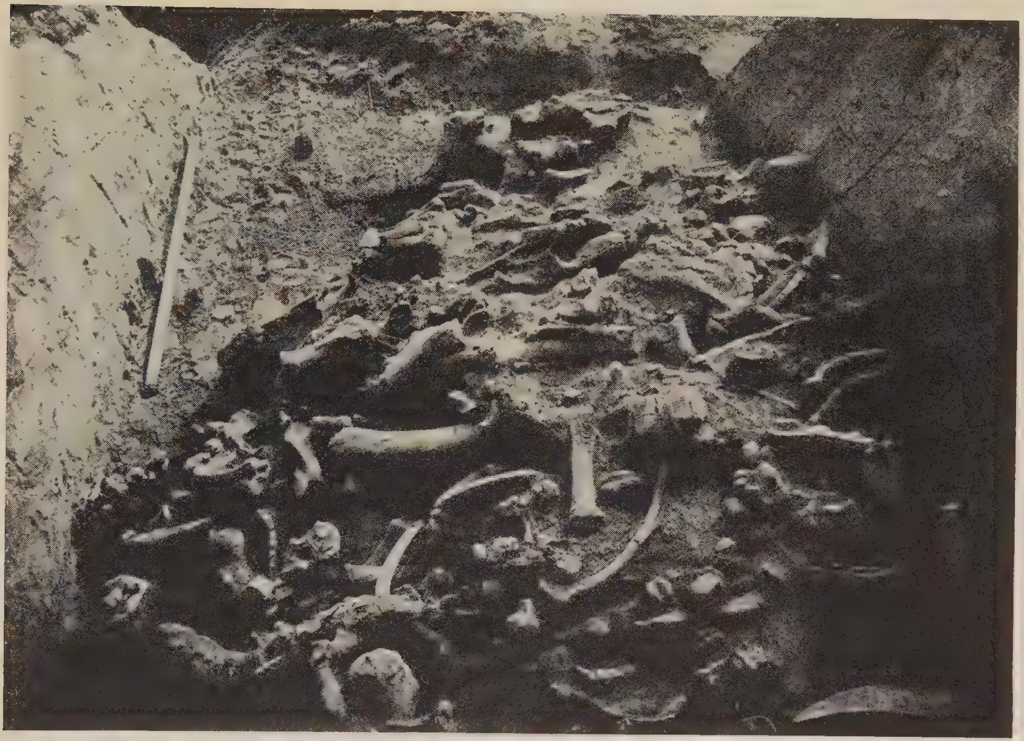
[1] Gromov, V. I., "Fauna of The Paleolithic Site of Berdizh," Pratzi of the Archeological Committee of the Bielorussian Academy of Sciences, Minsk, 1930, Vol. II, pp. 7–30.

[2] Those with asterisks are added from Gromov, V. I., "Geology and Fauna of the Palaeolithic Period in U.S.S.R.," Problems of the History of Material Culture, No. 1–2, Leningrad, 1933.

[3] Zamiatnin points out one such location, 4 klm. southeast of Berdizh near the village of Gorodovichi on the left bank of the Sozh.

Polikarpovich, K. M. ("Prehistoric Sites of the Middle and Lower Part of the Sozh River," Pratzi of the Archaeological Committee of the Institute of Bielorussian Culture, Vol. I, Minsk, 1928, p. 129), cites several locations near Berdizh.

[4] Zamiatnin points out that the poor quality of this flint in comparison with the fine, uniform material of Kostenki-Borshevo region may account for the somewhat rougher appearance of the Berdizh forms.



BERDIZH. AGGLOMERATION OF ANIMAL BONES IN BERDIZH. Photograph of S. Zamiatnin.

is 58 mm. (originally about 70 mm.). The notch (35 mm. long) on the right side is well pronounced and carefully made with a steep, dulling retouch. The presence of the graver facet on the right side indicates that after being broken, the tool was reworked and used as a graver.

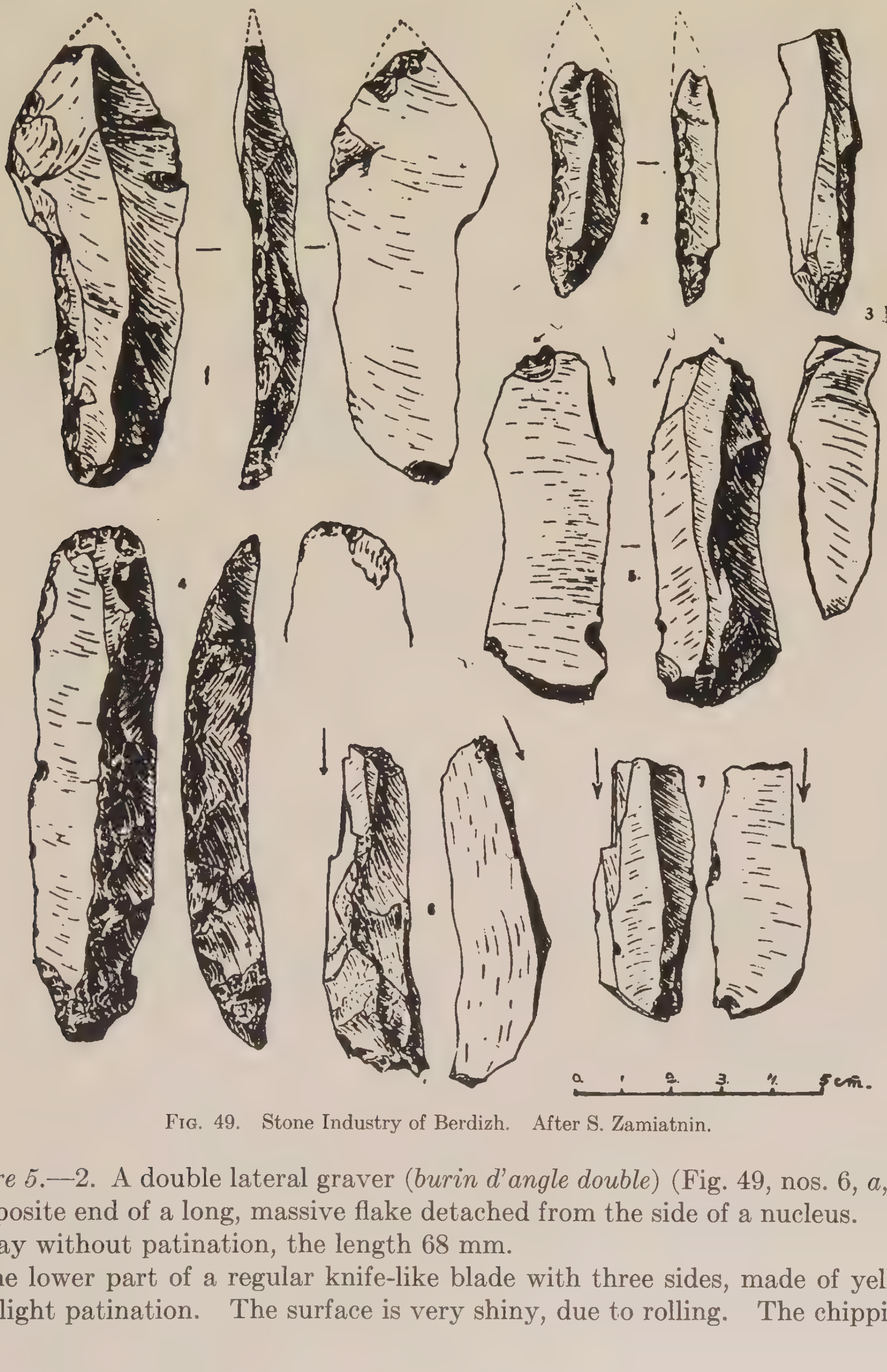


Fig. 49. Stone Industry of Berdizh. After S. Zamiatnin.

Square 5.—2. A double lateral graver (*burin d'angle double*) (Fig. 49, nos. 6, *a*, *b*) made on the opposite end of a long, massive flake detached from the side of a nucleus. The flint is dark-gray without patination, the length 68 mm.

3. The lower part of a regular knife-like blade with three sides, made of yellow-gray flint with light patination. The surface is very shiny, due to rolling. The chipping along

the edge is accidental, as it was done after the rest of the surface had become patinated. Length 30 mm. (Fig. 50, no. 12).

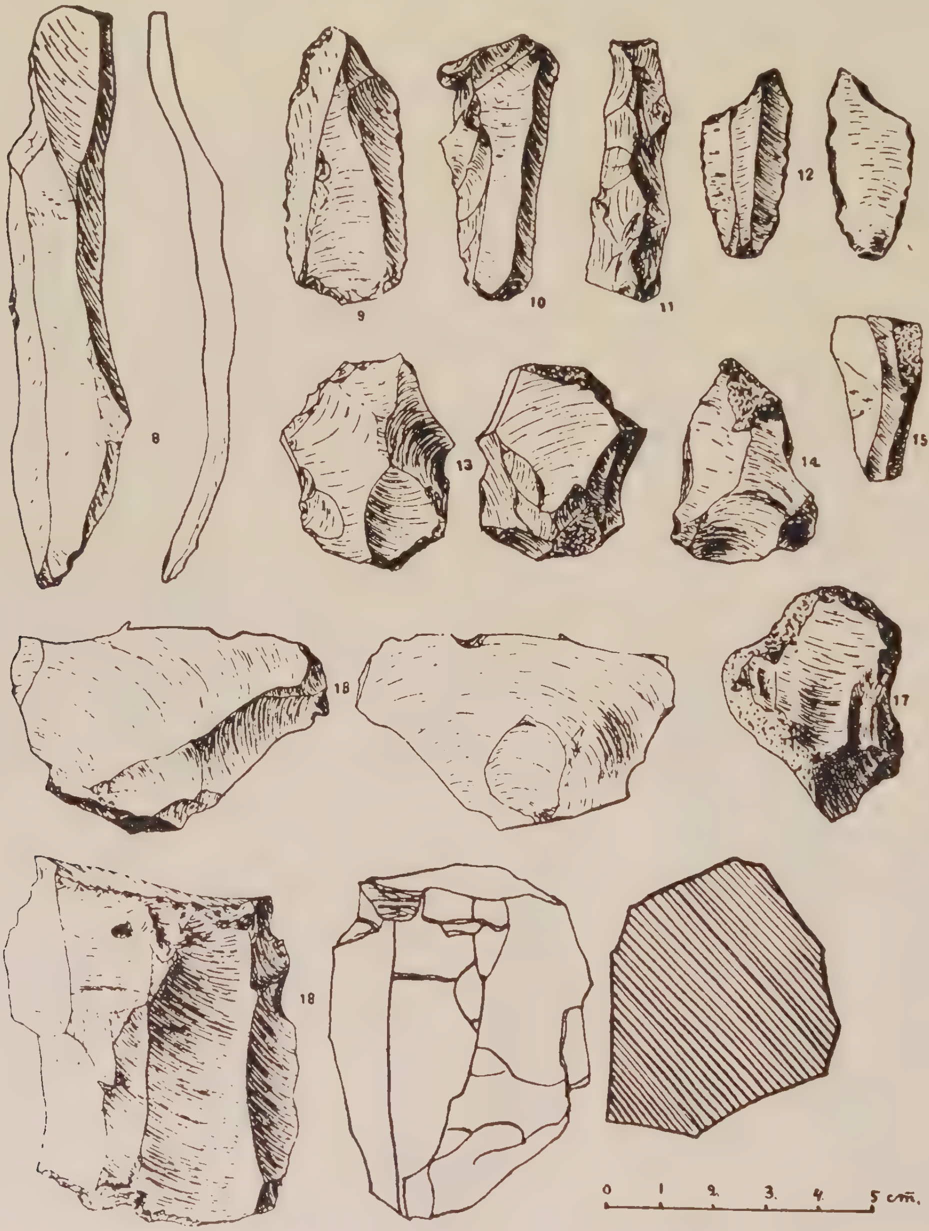


Fig. 50. Stone Industry of Berdizh. After S. Zamiatnin.

4. A small triangular flake of coffee-colored flint, 32 x 20 mm.

5. A hammer stone, a massive nodule of tabular flint with the crust partly preserved. On the upper working end are traces of numerous blows 42 x 32 mm. (Fig. 50, no. 17).

Square 9.—6. A long slender flake of coffee-colored flint, 30 mm. long.

Square 13.—7. A rather large atypical point (90 mm. long) with lateral notch, with the tip broken off.[1] The flint is dark-gray without patination. The notch (54 mm. long) on the left side of the tool is well pronounced. The dulling retouch of the notch is large and rough. The lower end is carefully rounded by retouch, and the lower surface of the upper end as well as the back is chipped with fine flat facets. This is a very nice example, rivaling the best of this type from Kostenki and Willendorf (Fig. 49, no. 1, *a*, *b*, *c*).

8. A scraper on the end of a long massive blade, detached from the side of a nucleus. The flint is dark with many incrustations. The upper part is slightly retouched on the left side. The very steep, dulling retouch of the working edge shows that the tool served for cutting rather than for scraping. Length 105 mm. This is the largest tool from Berdizh (Fig. 49, no. 4).

Square 17.—9. A triangular flake of dark transparent flint, 41 mm. long (no. 14).

10. The lower part of a small regular three-faceted blade. The crust of the nodule is partly preserved. Length 37 mm. (Fig. 50, no. 15).

11. A small fragment of a three-faceted blade of dark flint. Length 25 mm.

Square 18.—12. A massive, knife-like, three-sided blade of dark flint without patination. On the upper end are traces of retouch and an unskilled graver's facet. This implement represents an unfinished side graver. Length 70 mm. (Fig. 49, no. 5).

13. A massive flake (45 x 30 mm.) of grayish-cinnamon color, an irregular oval in shape, roughly chipped on both sides. One of the surfaces is chipped by large facets from the sides to the middle. The opposite, very convex side, is worked by rough retouch on the edges.[2] 45 x 30 mm. (Fig. 50, no. 13).

14. A nucleus of irregular prismatic form, slightly worked, with one striking platform. It is made of dark-gray flint with light-bluish patination in spots. Length 80 mm. (Fig. 50, no. 18).

15 and 16. Two wide flakes of irregular form. On one are traces of the crust. Sizes 40 x 38, 30 x 42 mm.

Square 20.—17. A small flake of gray flint without patination, 50 mm. long. The lower part with the bulb of percussion is broken off (Fig. 50, no. 11).

18. A very wide flake of dark-gray flint from the surface of the nodule. On the upper side and on the striking platform the lime crust is preserved. 60 x 80 mm.

SPACE BETWEEN PITS NO. 2 AND NO. 3.

19. A small "atypical point with lateral notch"[3] 48 mm. long, of dark-gray flint with bluish patination. The upper part of the implement is broken. The notch on the left side is 3 mm. long and is retouched by large facets. The lower end of the tool is likewise retouched (Fig. 49, no. 2).

20. A long, narrow, knife-like blade, very much curved, of dark-gray flint without patination. On the back, a small part of the crust remains. Length 112 mm. (Fig. 50, no. 8).

21–22. Two small, three-sided flakes, both of dark flint with spots of light-gray and bluish patination. The shiny surface and dulled edges indicate much rolling. The first one shows traces of use along the sides. Lengths: 53 and 51 mm. (Fig. 50, nos. 9 and 10).

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[1] *Pointe à cran.*? (E. G.)

[2] This specimen, like the preceding one, is unfinished. Zamiatnin considers this tool (*ebauche*) very important for the purpose of dating.

[3] *Pointe à cran.* (E. G.)

23. A flake, irregular in form, made of dark flint. (55 x 30 mm.)

24. A large, wide, irregular flake of cinnamon-colored flint. 88 x 66 mm. (Fig. 50, no. 16).

Pit No. 3, Southern End.

25. A graver with simple lateral facet (*burin d'angle*) on the end. The flint is covered by light, gray patination. The upper surface is polished, and the edges are smooth. Length 58 mm. (Fig. 49, no. 7).

These constitute the finds. Even this small quantity of material permits us to form a sufficiently definite conception of the flint industry of Berdizh.

Conclusions.—Summarizing, Zamiatnin gives the following picture: The site was located on the slope of the gully near its mouth. This condition is characteristic and is repeated in a number of sites. It is interesting that in the Don region a similar situation occurs in a group of older sites: Kostenki I, Borshevo I, Gagarino; while the later sites: Kostenki II, Kostenki III, Borshevo II are situated in the actual valley of the river. Thus, the very location of the site gives us some data for chronological calculations.

The cultural remains consist of a large quantity of animal bones. It is important to note, that according to V. I. Gromov, among sixteen individual mammoths, the remains of which are found in Berdizh, fourteen were young ones and only two adults. This preponderance of young animals already noted for other sites confirms the fact that the animal remains are the results of hunting activity on the part of man.

The small number of tools found seems to be incompatible with the large number of animal remains. This inconsistency may be understood if one considers the actual distribution of flint implements in other East-European sites with large accumulations of animal bones. Usually the remains of hearths do not contain large bones but are composed of a large quantity of small bits of bone, purposely broken tubular bones, charred bone, numerous flint tools, flakes and quantities of small flint chips. On the periphery of each of these "hearths" are one or several piles consisting almost entirely of large bones and containing no other cultural remains. Such accumulations were very likely refuse from feasts or perhaps material for fires. A similar distribution, is well expressed in Kostenki II, Mezine, etc. An especially good illustration are the large heaps of bones found by K. Absolon in Lower Wistirnitza in Moravia.

Evidently we are dealing with the same situation in Berdizh. The excavation uncovered only the bone pile, which here, as well as in other sites, is very poor in flint finds. The hearth, which probably lies nearer the bottom of the gully, as yet is not uncovered; it should contain much more flint material and thus will enrich our knowledge of the Berdizh industry.

The flint industry of Berdizh man is characteristic of the Upper Palaeolithic Age. Thus we have (1) the irregular prismatic nucleus, (2) the long blade with not very careful retouch of the back, (3) the graver, the most characteristic tool of the Upper Palaeolithic, is present in its basic forms: (*a*) the side graver (*burin d'angle*) made of a blade retouched on the end, (*b*) made on the end of a broken blade, (*c*) double graver, (4) the scraper on the end of a long flake.

But the most interesting form of the Berdizh site is the point with the lateral notch. This tool, represented in the Berdizh material by three characteristic examples, immediately places this industry in a definite archaeological division, connecting it on one hand with the group of early Upper Palaeolithic sites of the Don region (Kostenki I, Borshevo I, Gagarino), and on the other hand with the late Aurignacian sites of Moravia, and Lower Austria (Predmost, Wisternitz, Pekarna, Willendorf, etc.)

The Berdizh point, is especially similar to the tools of the upper horizon of Willendorf and Kostenki I, in its large size and its definitely worked form, which distinguish it from "atypical" points of Western-European sites of this period. It is interesting that in Berdizh (as far as may be said considering the limited material) this point with the lateral notch constituted a considerable percentage of the finds, as is the case in Kostenki I.

Besides the point with the lateral notch, another form also gives interesting indications of the cultural connection of Berdizh. This is the tool with bifacial technique (described as no. 18).[1] The forms nearest to it, which are connected with the industry of the Hungarian Solutrean, were found recently in some East-European sites. Unfortunately, the scarcity of material does not permit us at present to speak of this more fully.

In 1928 excavations in Berdizh were made by K. M. Polikarpovich. In his material, among other forms, is found an interesting tool, which has the shape of a characteristic Mousterian *coup de poing*, with the upper side convex and the lower one flat, worked by large flakes. Considering the above-mentioned connections with the Hungarian Solutrean, it is not necessary to seek an explanation of this from in the accidental mixture of the cultural layers of the site.

It is interesting to note that the excavations of 1928 produced a large quantity of the points with the lateral notch, which are represented by a fine series.[2]

Dating.—In conclusion it is necessary to underline the important facts in regards to the geological and cultural age of this site. Professor G. F. Mirchink,[3] on the basis of his study of geological conditions indicates that it was formed "right after the maximum retreat of the Würm glaciation and before the formation of the end moraines of the Bühl stage." This dating corresponds quite accurately with the placing of the Berdizh culture in the late Aurignacian, which for Western Europe corresponds to the Achen stage.

The investigation of Berdizh, of course, cannot be considered final. Further work there could bring out much that is valuable (hearths, a larger series of the stone and bone industries, perhaps, objects of art) to substantiate and confirm the present dating. But even as it is, the site of Berdizh can enter prehistory as one of the classical sites of Eastern Europe, which forms an important link between the early group of the Don and the rich sites of Moravia and Lower Austria. It clearly confirms the correct chronological corellations of the geological and cultural stages of Quaternary Man.

7. Mezine

The site of Mezine is situated on the right bank of the Desna River in the village of Mezine, Kroletz district, Chernigov region. (No. 19 on the map, Fig. 51.) It was

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[1] Zamiatnin does not give any details or picture of this tool.

[2] No actual material or illustrations were seen by the author. (E. G.)

[3] Mirchink, G. F., "Geological Condition of the Palaeolithic Site of Berdizh on the River Sozh," The Pratzi of the Archaeological Committee of the Bielorussian Academy of Science, Vol. II, p. 5, Minsk, 1930.

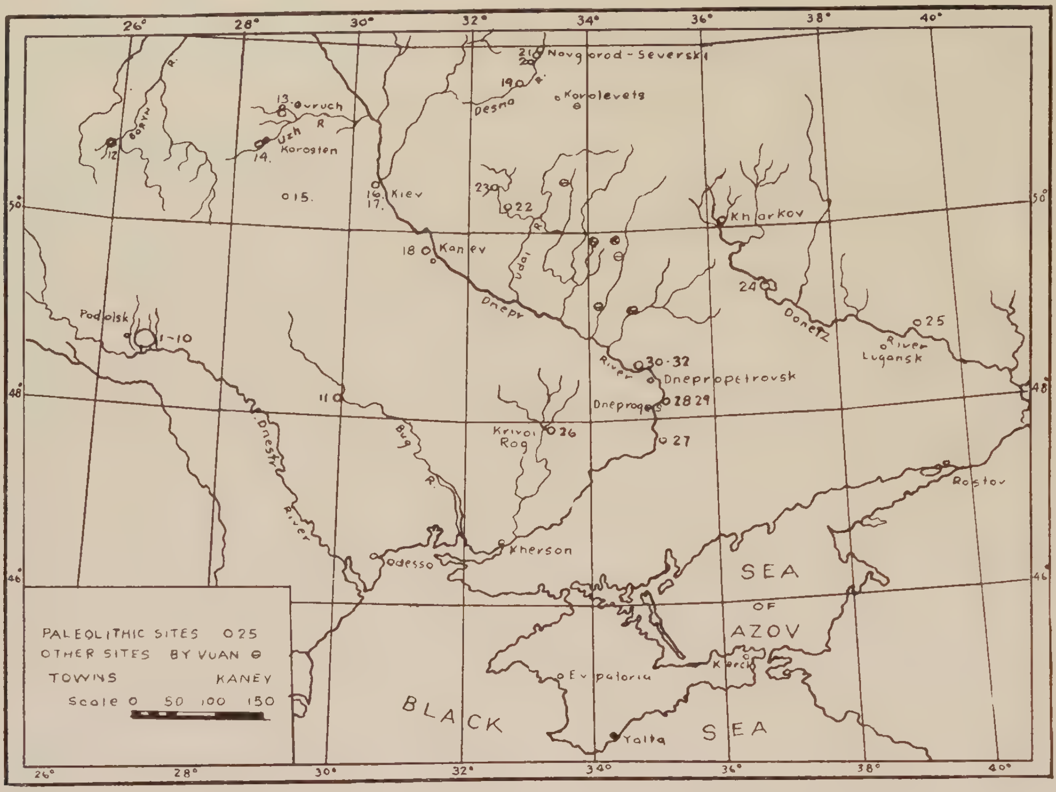
26°
28°
30°
32°
34°
36°
38°
40°
50°
48°
46°
21
20
Novgorod-Seversk
19
Desna
Korolevets
13
Ovruch
R
Uzh
14
Korosten
12
Goryn R
o 15
16
17
Kiev
23
22
Kharkov
18
Kanev
Udai
24
Dnepr
Donetz
o 25
River
Lugansk
Podolsk
1-10
River
30-32
Dnepropetrovsk
11
Dneproges
28 29
Dnestr
Bug
Krivoi Rog
26
27
R.
River
Rostov
Kherson
Odessa
SEA
OF
AZOV
Kerch
Evpatoria
BLACK
SEA
Yalta
PALEOLITHIC SITES O25
OTHER SITES BY VUAN ⊖
TOWNS KANEV
Scale 0 50 100 150

FIG. 51. MAP OF THE PALAEOLITHIC SITES OF SOUTH RUSSIA.

1. Sokol.
2. Vrublintzi.
3. Kitaigorod I and II.
4. Demshyn.
5. Kolachkovichi.
6. Studenitza.
7. Bakota.
8. Staraya Ushitza.
9. Kosheleva.
10. Kalus.
11. Semenki.
12. Gorodok.
13. Dolginichi.
14. Korosten.
15. Kolodiazhonoye.
16. Kiev, Cyrill Street.
17. Kiev, Protasov Yar.
18. Selis'che.
19. Mezine.
20. Pushkari.
21. Novgorod Seversky.
22. Gontzi.
23. Zhuravka.
24. S'churii Rog.
25. Lugansk.
26. Krivoy Rog.
27. Kodak.
28. Dubova Gully.
29 Kastrova Gully.
30. Osokorovka.
31. Miorka.
32. Yamburg.

discovered in 1907, excavated by Th. K. Volkov [1] and later in 1909 by P. P. Ephimenko.[2]

Location and Geology.—This site is located at the base of the river bank, overlooking the valley of the creek, a tributary of the Desna. In a complete geological cross-section of the shore, according to Armashevsky,[3] we have the following situation:

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[1] Volkov, Th., "The Palaeolithic Site in the Village of Mezine, Chernigov Province," Trudi of XIV Archaeological Congress, Moscow, Vol. 3, pp. 262–270, 1911.

Also, "Nouvelles découvertes dans la station paléolithique de Mezine," Congres International d'Anthropologie et d'Archeologie Préhistorique. Compte-rendu de la XIV Session, Geneve, 1912, Vol. I, pp. 415–428, and the article in Bulletin et Memoires de la Société d'Anthropologie de Paris, 1909, Nos. 4–5, p. 501.

[2] Ephimenko, P. P., "The Stone Implements of the Palaeolithic Site in the Village of Mezine, Chernigov Province," The Annual Report of the Russian Anthropological Society of the Imperial St. Petersburg University, Vol. IV, pp. 62–102, St. Petersburg, 1913.

[3] Armashevsky, P., "The Geological Survey of Chernigov Province," Zapiski of the Society of Naturalists, Kiev University, Vol. VII, Pt. I, p. 30.

1. Humus.
2. Loess.
3. Boulder clay.
4. Tertiary green-gray glauconite sands.
5. Chalk-foundation.

The layer of chalk forms the common base, the rest of the layers of the site are not in primary, but in secondary diluvial positions, in consequence of which their thickness and contents, in comparison with the basic deposits, were changed. Thus Th. K. Volkov gives the following cross-section of the spot of the find:

1.	Plowed earth, sandy, sometimes of clayish consistency, with remains of vegetation	0.80 meters
2.	Loess with small chalky formations	0.80 meters
3.	The cultural layer of reddish clay with fragments of bones and flints	2.70 meters
4.	Yellow clay, perhaps loess or loess-like	0.10–0.15 meters
5.	Green-gray, fine sand with grains of glauconite	1.05 meters
6.	Orange-yellow sand	0.25 meters
7.	Chalk	0.07 meters

Especially interesting is the description of the cross-section of the Mezine site given by the geologist G. F. Mirchink: [1] "I have recorded during my visit with A. P. Pavlov and A. N. Soboliev in 1914, during excavations, conducted by the collaborators of Mr. T. Volkov, the following layers:

1.	Slightly porous loess, diminishing southward toward the valley, increasing toward the mountains.	
2.	Cultural layer with large bones.	
3.	Sandy, loess-like, pale yellow clay	0.56 meters
4.	Layer of sand	0.3–0.05 meters
5.	Pale yellow, slightly porous, loess-like sandy clay	0.7 meters
6.	Green-gray glauconite sand	0.2 meters
7.	Yellow sand	0.2 meters
8.	White chalk, the base of which is 10.3 meters over the level of the Desna River.	

Mr. Mirchink considers the first layer of loess of post-glacial diluvial origin; the third, of loess-like clay, belonging to the alluvial or diluvial deposits of the fourth glaciation.

P. P. Ephimenko [2] in 1909 made additional excavations. Enlarging the trial excavations of Volkov from 9 square meters to 18 square meters, he found the following stratigraphy:

1. Humus.
2. Loess-like, yellowish loam (3–4 m. thick) of the same character as the valley loess, but differing from the latter in being rougher and of schistous formation.
3. A cultural layer of dark loam, colored by organic remains, particles of charred bone and wood. It had, besides, a considerable admixture of red ferrous matter.

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[1] Gorodzov, V. A., "Archaeology." The Stone Age, Vol. I, Moscow, 1925, p. 279, quoting from Mirchink's manuscript.

[2] Ephimenko, P. P., "The Stone Implements of the Palaeolithic Site in the Village of Mezine, Chernigov Province." Annual Report of the Russian Anthropological Society of the Imperial St. Petersburg University, Vol. IV, St. Petersburg, 1913, pp. 9–102.

This layer had an incline of 15–20°, corresponding to the direction of the layers of loam. It increases in thickness toward the southeast and contains flints and numerous bones of the mammoth, reindeer, musk-ox, and horse.

4. The same as layer 2.
5. A layer of green glauconite and ochreous sands.
6. A layer of chalk.

According to Ephimenko, the geological history of the deposit was as follows: With the retreat of the glacier there followed a period of loess formation which corresponds either to the interglacial, or to the period of the final retreat of the ice. The loess was deposited in horizontal layers on the plateaux, but in the valleys in sloping layers, and there it is somewhat coarser in structure. Long before the end of this process, palaeolithic man selected this bank for his settlement, the cultural remains left by him being covered by the subsequent deposition of the loess. The presence of such animals of the cold climate, as *Ovibos moschatus, Alopex lagopus, Rangifer tarandus,* suggests that the ice was not very far away.

Ephimenko also asserts that the cultural remains were undoubtedly discovered *in situ* and not as a secondary deposition. This is evident from the absence of rolling action on the implements, and the fact that alongside the bulky and large bones of animals were found small flints and particles of charcoal and ashes.

The cultural layer is not uniform in contents. In places among the mass of chips there is a definite predominance of finished implements of certain types, in other spots there is an agglomeration (not accidental) of animal bones of large size (compare Gontzi, Kostenki, etc.). Thus, in the northwest corner of the excavated area was found a large pile of mammoth tusks, reindeer antlers, and other bones, as though it were a store of raw material for manufacturing of bone implements.[1]

Fauna.—

1.	*Elephas primigenius.*	
2.	*Rhinoceros tichorhinus*	very few.
3.	*Equus caballus*	very numerous.
4.	*Ovibos moschatus*	numerous.
5.	*Bison (priscus)* (?).	
6.	*Rangifer tarandus*	numerous.
7.	*Canis lupus.*	
8.	*Alopex lagopus.*	
9.	*Ursus arctos.*	
10.	*Lepus (variabilis?).*	
11.	*Gulo borealis* (?).	

About sixty shells of Tertiary age were found, the majority of which were perforated for stringing.

The faunal remains were identified by Mme. M. V. Pavlova and the Swiss zoologist, Dr. Schtuder. The bulk of the bones belong to the *Elephas primigenius, Ovibos,* and *Cervus tarandus.* Among the bones of *Canis lupus,* according to Schtuder, there was a fragment of lower jaw having certain characteristics similar to *Cyon europeus,* a diluvial wild dog.

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[1] Ephimenko, P. P., "The Stone Implements of the Palaeolithic Site in the Village of Mezine, Chernigov Province," The Annual Report of the Russian Anthropological Society of the Imperial St. Petersburg University, Vol. IV, St. Petersburg, 1913, pp. 9–102.

The Stone Industry.

Material.—The chief material for the stone work was flint, obtained in the vicinity, where even now many flint nodules are found in the gullies. This flint is of chalk origin, dark gray, almost black in color. The patination is either altogether absent or very thin, only dulling the surface or covering it with white or lilac spots.

Out of many thousands of flint chips, filling the cultural layer in the form of rejects, remains of manufacture, or blades prepared for the final work, over one thousand finished tools were found.

A detailed description of the flint industry is given by P. P. Ephimenko in the article cited above, from which are reproduced the most important forms and a description of the types.

I. *The Nuclei.*—These are encountered often; several hundred were obtained. They are usually not large, about 5 cm. in length (Fig. 52, nos. 13, 14).

II. *Hammerstones.*—Hammerstones are not very typical (Fig. 52, no. 15).

Flakes.—Flakes are very numerous, but regular forms with parallel sides are absent. They were usually small, 5–6 cm. long (Fig. 52, no. 3) and in most cases were utilized as cutting tools, a few being retouched on the side (Fig. 52, nos. 1, 6).

Scrapers.—*Grattoirs,* mostly made on small blades up to 6 cm. in length, terminating with a convex retouched edge, are typically Magdalenian. The retouch is very accurate (Fig. 53, nos. 1–3, 5–7). In two cases they are combined with *burins* (Fig. 53, nos. 6, 2), or form double scrapers (Fig. 53, no. 7). Besides the described forms there were found oblique side scrapers, twenty-three of which were made on irregular flakes with one side roughly retouched, and some very small ones ranging from 1–3 cm. in length and 1–4.8 cm. in width, with fine retouch.

Concave scrapers (Fig. 53, nos. 4, 12, 13, 14, 15), which according to Ephimenko were used mostly for work on bone, are of two types:

1. *Lames* and flakes with a carefully retouched segment-like notch on one side. Sometimes two or three of these notches (*coches*) are found.
2. The usual concave scraper with the notch on one end.

Perforators.—There were found perforators (*percoirs*) in a considerable quantity (260) besides triangular flakes, obtained accidentally and slightly retouched for the same use (*outils de fortune*). The following types can be distinguished:

1. Perforators with working point in the middle (Fig. 54, nos. 1–4, 7–10, 15–20, 23–25)
2. Side Perforators (*percoirs lateraux*) (Fig. 54, nos. 5, 6, 12, 13, 14)
3. Angle Perforators (*percoirs d'angle*) (Fig. 54, nos. 21, 22, 26, 27).

Lames and Lamelles (Fig. 52, nos. 7–9).—Some 150 small blades with a retouched side (*petites lames a tranchant lateral abattu*) were found. They are usually 2.3 cm. long, and 0.3 cm. wide, finely retouched, some of the geometrical forms reminding one of Tardenosian types.[1] One side is backed, the other (*tranchant vife*) left intact. Both ends are carefully retouched to a point and could be used either for drilling the eye in a bone needle, engraving, or tattooing. They often have a definite *coche* in conjunction with a perforator which may have been used as a hollow scraper.

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[1] The forms illustrated are not typical geometrical forms of the Tardenosian period. (E. G.)

Gravers.

Gravers form the largest group of tools. *Bec de flûte* type is very rare. Most of them are made on massive irregular flakes with the facet formed by two longitudinal blows at an angle (Fig. 56, nos. 1, 2).

Side gravers (*burin d'angle, burin lateral*), are very common (250) (Fig. 56, nos. 11–14). Usually they are made from a long blade, the end of which is carefully retouched; then by a longitudinal blow a flake is detached, forming a cutting edge. Often the sides are dulled by a hand-protecting retouch. Double forms are numerous (Fig. 56, nos. 15–16).

Middle gravers (*burins medianes*) are much less numerous (25), usually made on a wide thick flake (Fig. 54, nos. 28, 31).

Parrot-beak gravers (Fig. 55, nos. 13, 14) (*bec de perroquet*) are not the typical French forms, but very similar to the Magdalenian VI. In most cases they are small graver points with a beak-like, curved end. Many have a dull, flat back suggesting perhaps a good place for the index finger.[1]

The *percoir-burin* is usually a short massive flake, the end of which is obliquely chipped to form a massive three-facetted point. (Fig. 55, nos. 1, 5).

Ephimenko concludes his analysis by pointing out the similarity with the French Upper Palaeolithic types. "The general character of the Mezine stone industry, the technique of the preparation, the small size of the implements as well as the types and forms, connect this station with the Upper Palaeolithic, and above all with the Magdalenian sites of Western Europe." [2]

The following implements are reproduced here from illustrations given by P. P. Ephimenko:

Fig. 52:

1. Flake retouched on both edges.
2. End scraper (?).
3. Long triangular blade.
4. *Burin d'angle* (?).
5. Side scraper on thin flake.
6. Same as 1.

7–9. *Lames a dos rabbatu.*

10. *Burin* flake.

11–12. Nucleiform scraper.

13–14. Nuclei.

15. Hammer stone.

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[1] While both Ephimenko, P. P. ("The Stone Implements of the Palaeolithic Site in the Village of Mezine, Chernigov Province," Annual Report of the Russian Anthropological Society of the Imperial St. Petersburg University, Vol. IV, pp. 62–102), and Volkov, T., ("The Palaeolithic Site in the Village of Mezine, Chernigov Government." Trudi of XIV Archaeological Congress, 1909, Vol. 3, pp. 262–270), definitely speak of *bec de perroquet* type, neither of them reproduce any tools with clearly pronounced *burin* stroke. (E. G.)

[2] Ephimenko, P. P., "The Stone Implements of the Palaeolithic Site in the Village of Mezine, Chernigov Province," Annual Report of the Russian Anthropological Society of the Imperial St. Petersburg University, Vol. IV, pp. 62–102, St. Petersburg, 1913.

Fig. 53:

1. *Grattoir museau.*
2. End scraper.
3. End scraper.
4. Convex end scraper.
5. Concave end scraper.
6. Concave end scraper and *burin bec de flûte.*
7. Double *grattoir.*
8. Scraper (?).
9. *Percoir-burin.*
10. Notched scraper.
11. Triangular scraper (?).
12. Notched scraper.
13. Notched scraper.
14. *Burin d'angle.*
15. Notched scraper.
16. *Burin d'angle.*

Fig. 54:

1–4. Single perforator.
5. Double perforator.
6–7. Single perforator.
8–10. Double perforator.
11–13. Single perforator.
14. Double perforator.
15–24. Single perforator.
25. *Burin d'angle* (?).
26–27. Notched scrapers.
28–29. *Burin d'angle.*
30. Perforator.
31. *Burin d'angle.*

Fig. 55:

1–5. *Burin d'angle.*
6. Double perforator.
7. *Burin d'angle.*
8. *Burin d'angle* and *bec de flûte.*
9. *Burin bec de flûte.*
10–11. Perforator.
12. *Burin d'angle.*
13–16. *Burin bec de perroquet.*
17–18. Perforator.

Fig. 56:

1. *Burin d'angle.*
2. *Burin d'angle.*
3. *Burin bec de flûte.*
4. Nucleiform *burin.*
5. *Burin bec de flûte.*
6–16. *Burin d'angle.*[1]

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[1] The description is given on the basis of illustration, and often differs in nomenclature, from one given by Ephimenko.

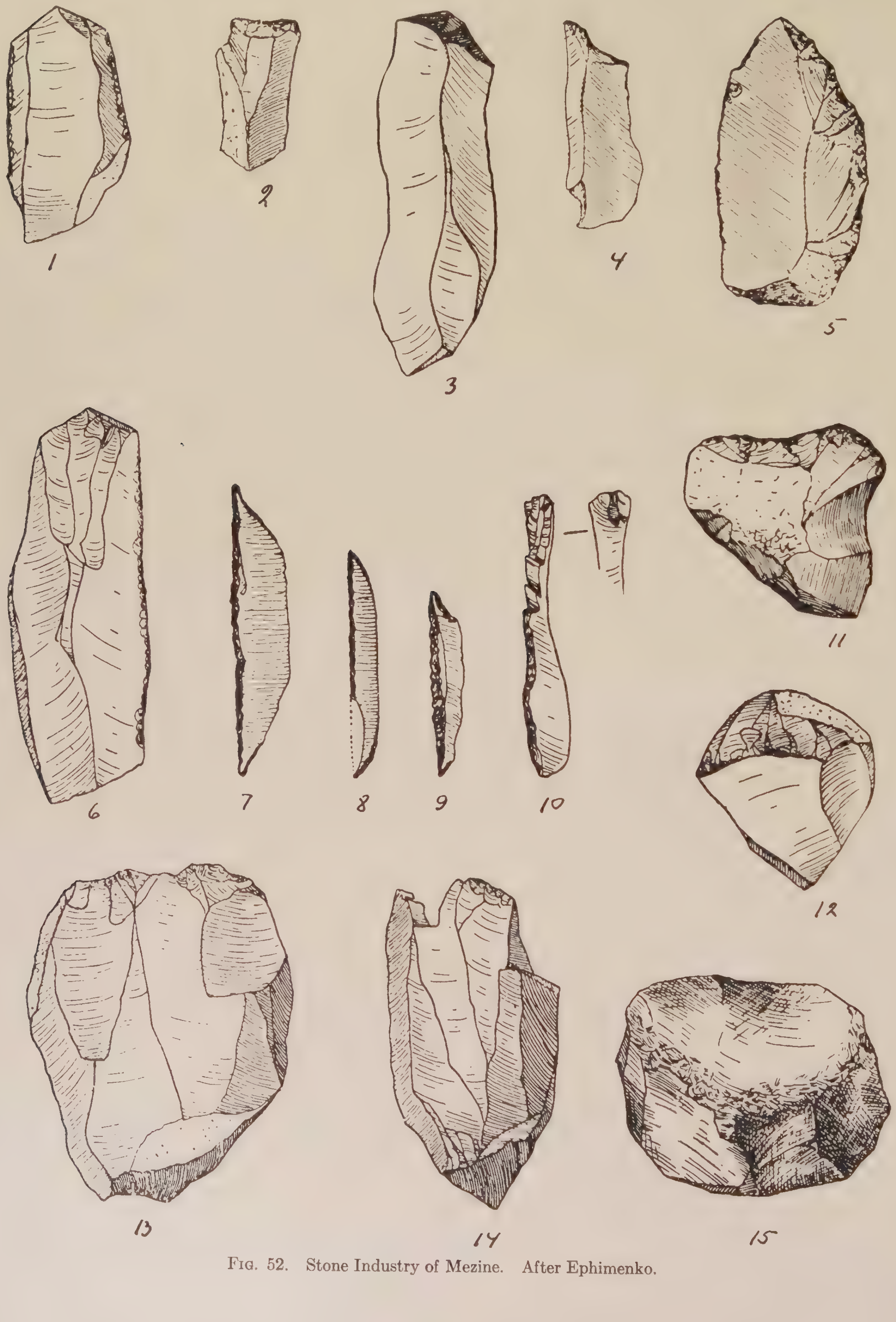
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FIG. 52. Stone Industry of Mezine. After Ephimenko.

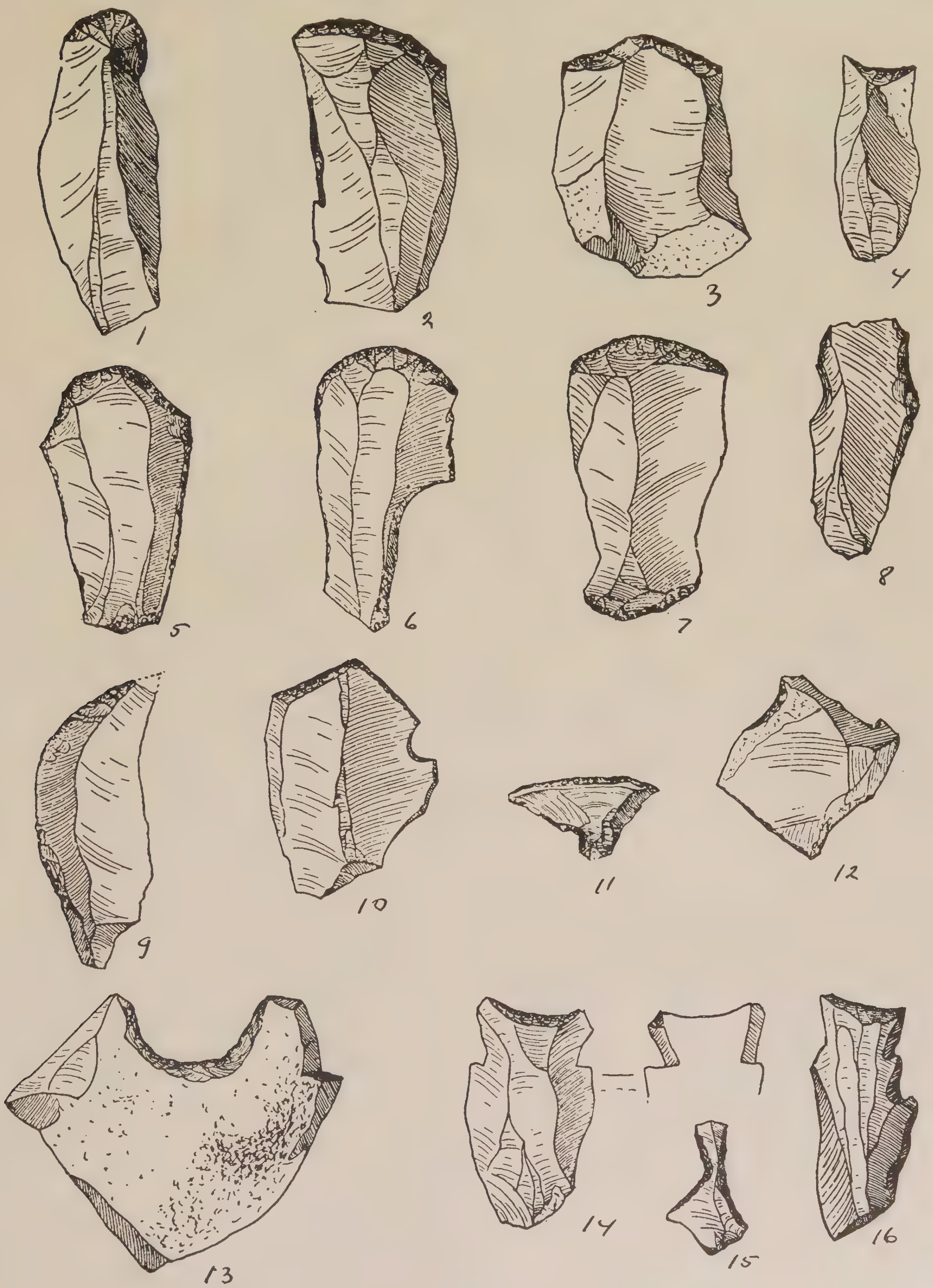
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FIG. 53. Stone Industry of Mezine. After Ephimenko.

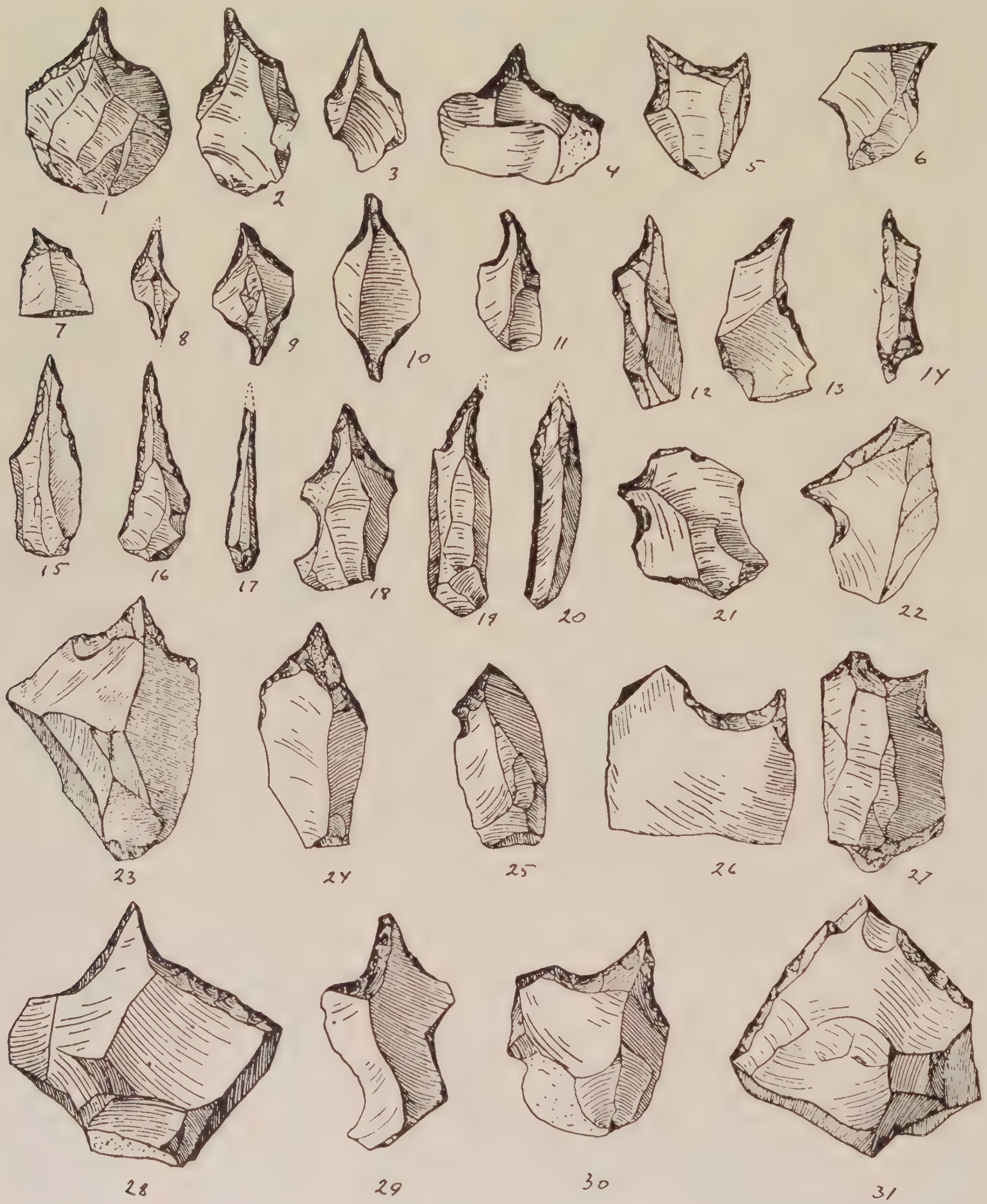
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Fig. 54. Stone Industry of Mezine. After Ephimenko.

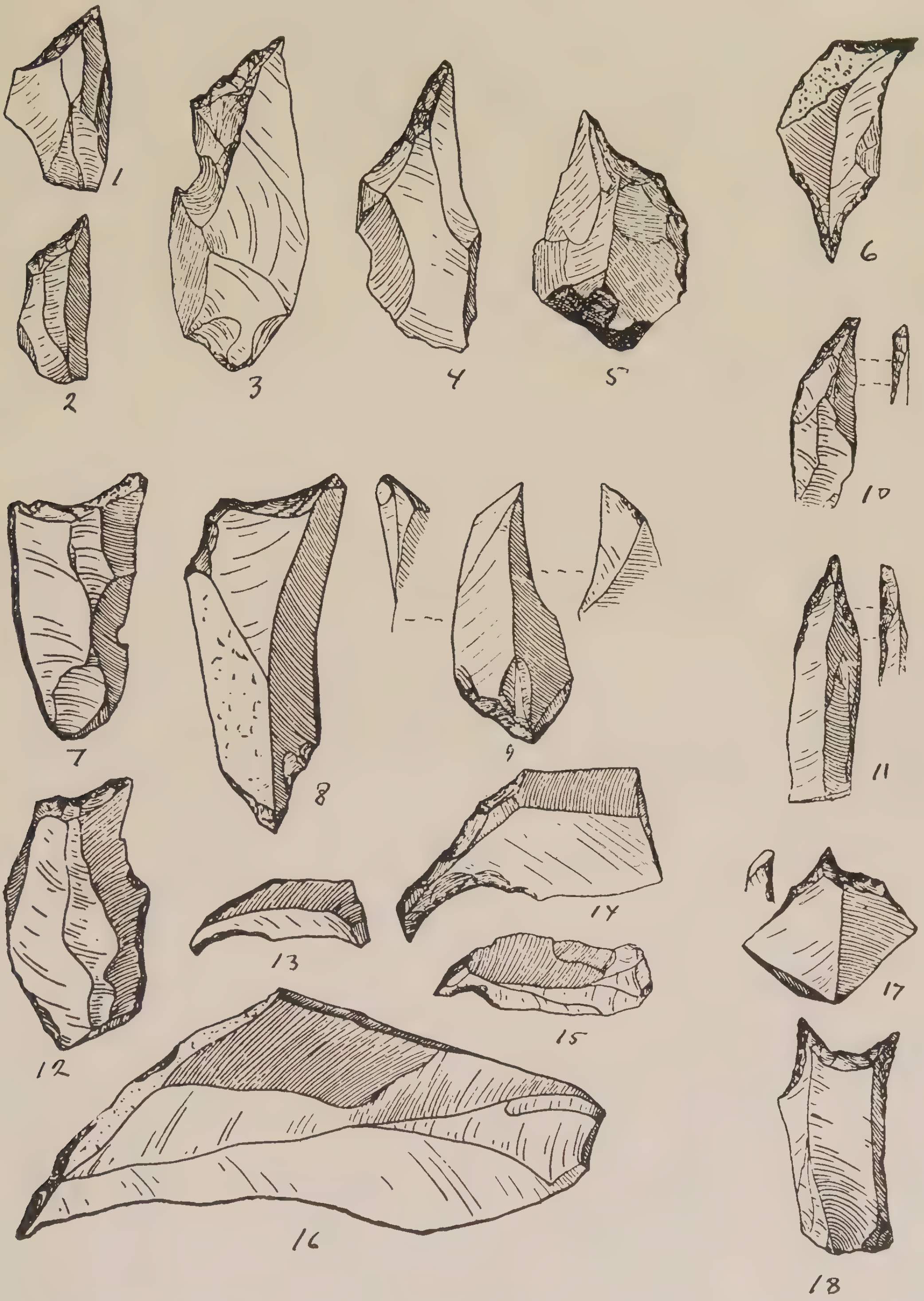
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Fig. 55. Stone Industry of Mezine. After Ephimenko.

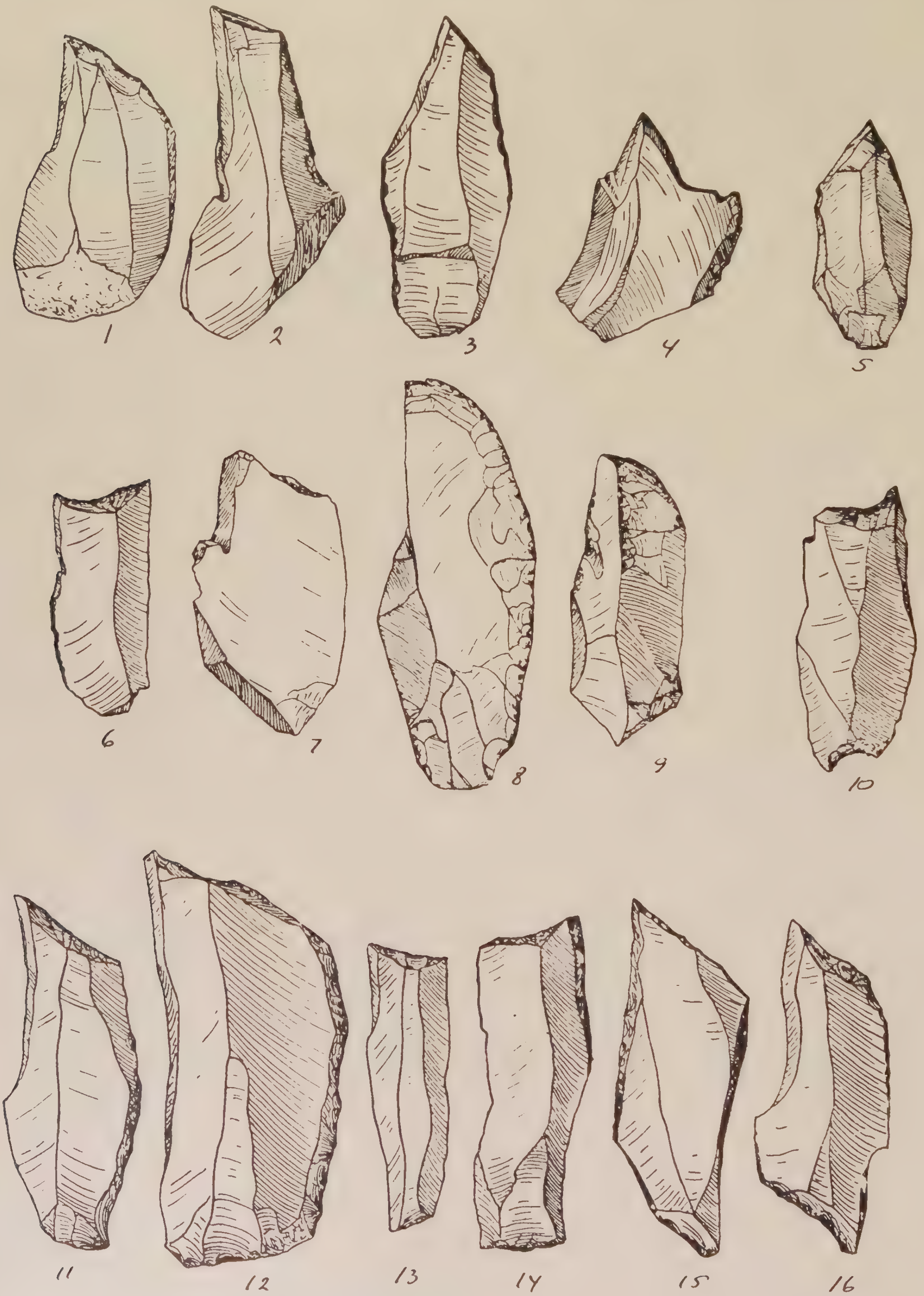
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Fig. 56. Stone Industry of Mezine. After Ephimenko.

Bone Industry.

The bone industry of Mezine by its richness and variety corresponds to the development of its stone work. Unfortunately, the most complete and recent publication [1] gives rather unsatisfactory reproductions. The following description is based on the above work with additional information furnished by other authors.[2]

Awls.—A large number of awls were made out of long splinters of the tubular bones of animals, with sharp polished points (Fig. 57, nos. 1–6, 14–18). In some cases the articulation of the bone was preserved (Fig. 57, nos. 1, 6, 16, 17).

Needles.—According to investigators, needles were usually perforated. One, found by Ephimenko in 1909, was of the size of a small steel needle (Fig. 57, no. 15), but the reproduction of the fragment does not show the eye.

Dart Points.—Dart points were made of mammoth ivory and reindeer horn, round in cross-section, tapering down on both ends, with two longitudinal grooves (Fig. 57, nos. 8, 9).

Mallets.—The mallets were made of reindeer horn (Fig. 57, nos. 10, 11). The complete specimen shows adaptation for hafting.

"*Dart-shaft Straightener.*"—An object made of mammoth ivory, more or less pointed and round on one end, and flat and round on the other. The flat end has a slightly oval hole. Volkov sees the analogy with the tools employed by the Chukchi of Siberia to soften the strips of hide, while P. Ephimenko calls it a dart-shaft straightener or *baton de commandement* (Fig. 57, no. 13).[3]

Saw (?)—There is an implement of unknown use made out of rib with a serrated, saw-like edge (Fig. 57, no. 7).

Polisher (*lissoir*).—A polisher made of the mammoth tusk has one end (the handle) hacked, the other polished. In the geometrical design on it, Volkov sees the schematic representation of an animal, the legs of which are represented with double lines. Over it, the series of chevrons reminds him of the North American Indian manner of representing a summer dwelling (Fig. 58, no. 11).[4]

Perforated Point.—There is a point made of mammoth tusk, perforated on one end (the other is broken), with a series of double oblique lines on both faces, called a needle by Volkov (Fig. 58, no. 3).

Plaques.—A group of round and square plaques, richly decorated with engraved lines, chevrons, and Greek key designs are made of mammoth tusk. Most of them have traces of perforation (Fig. 58, nos. 1–15).

Pendants.—There is also a series of oval pendants with a perforation on the obtuse end, made out of mammoth tusk. Ephimenko remarks that they imitate the shape of a reindeer tooth.[5] The other pendants are of mammoth tusks very schematically representing animals sitting on their haunches.[6]

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[1] Rudinsky, M., "Bone Industry of the Palaeolithic Site of Mèzine in the Interpretation of T. Volkov," Ukrainian Academy of Sciences, Anthropological Laboratory of T. Volkov, Kiev, 1931, pp. 1–65, 32 plates.

[2] P. P. Ephimenko, "Pre-Clan Society," Leningrad, 1936, p. 393.

[3] Compare with "*baton percé* from Predmost, Breuil, H., "Voyage Paléolitique en Europe Central," L'Anthropologie, t. XXXIV, fig. 13, nos. 1 and 7.

[4] Compare Ibid., fig. 16, no. 3.

[5] See Rudinsky, M., "The Bone Industry of the Palaeolithic Site of Mezine in Interpretation of T. Volkov," Ukrainian Academy of Sciences; Anthropological Laboratory of T. Volkov, Kiev, 1931, Fig. XXI; p. 150; also: Ephimenko, P. P., "Pre-Clan Society," Leningrad, 1936, Fig. 129.

[6] See Rudinsky, M. (opus cit.), Table XIV.

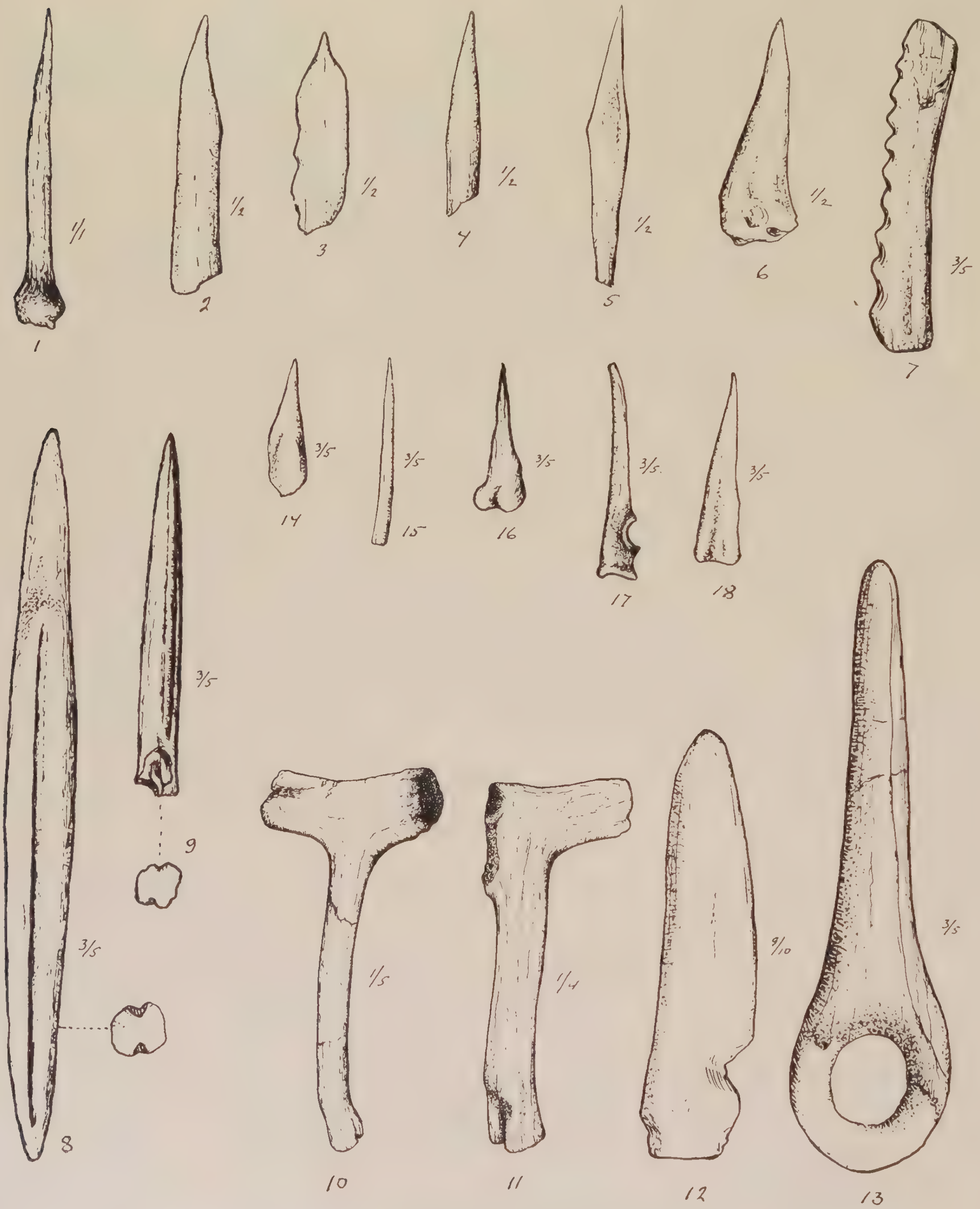
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Fig. 57. Bone Industry of Mezine. After M. Rudinsky.

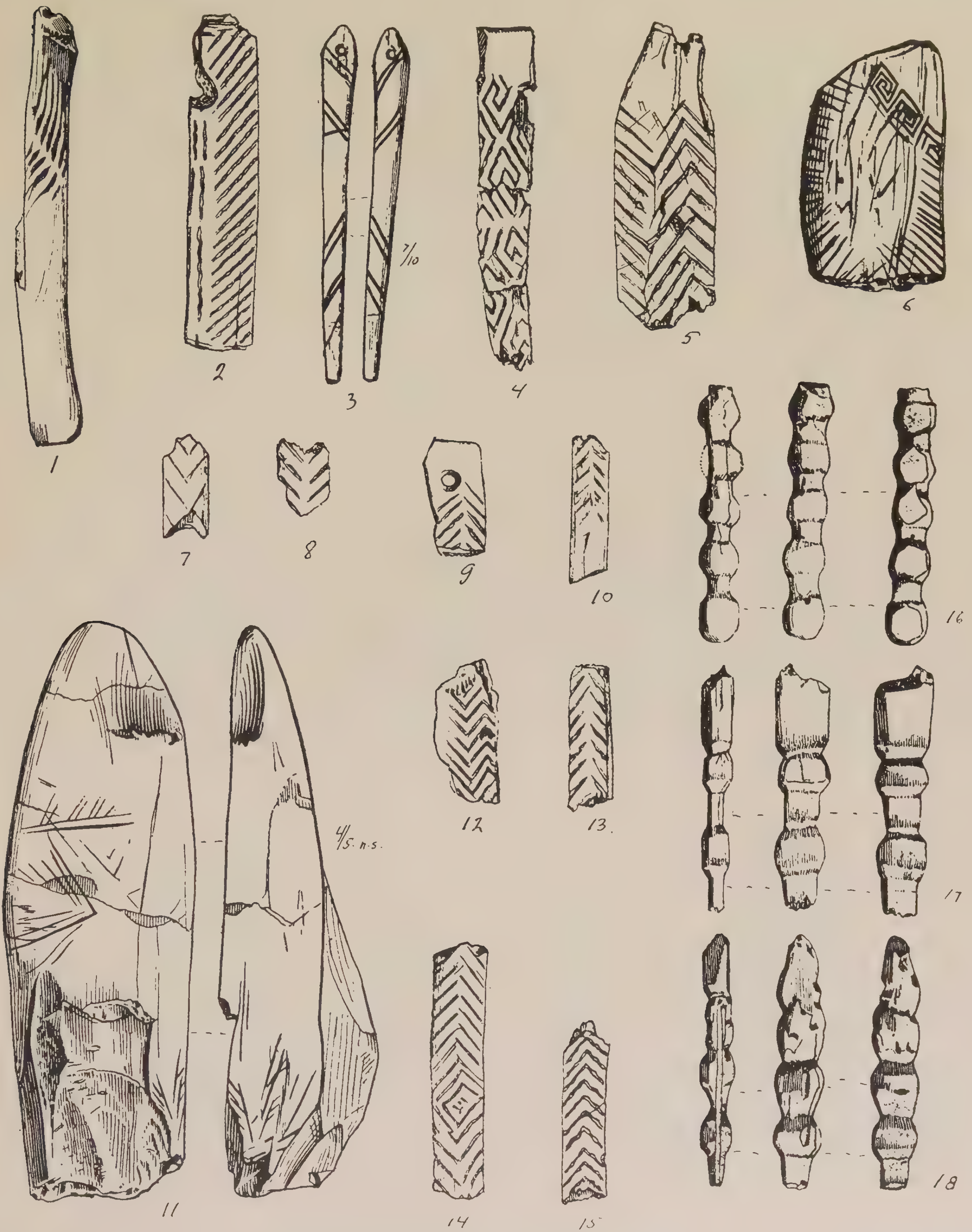
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FIG. 58. Bone Industry of Mezine. After M. Rudinsky.

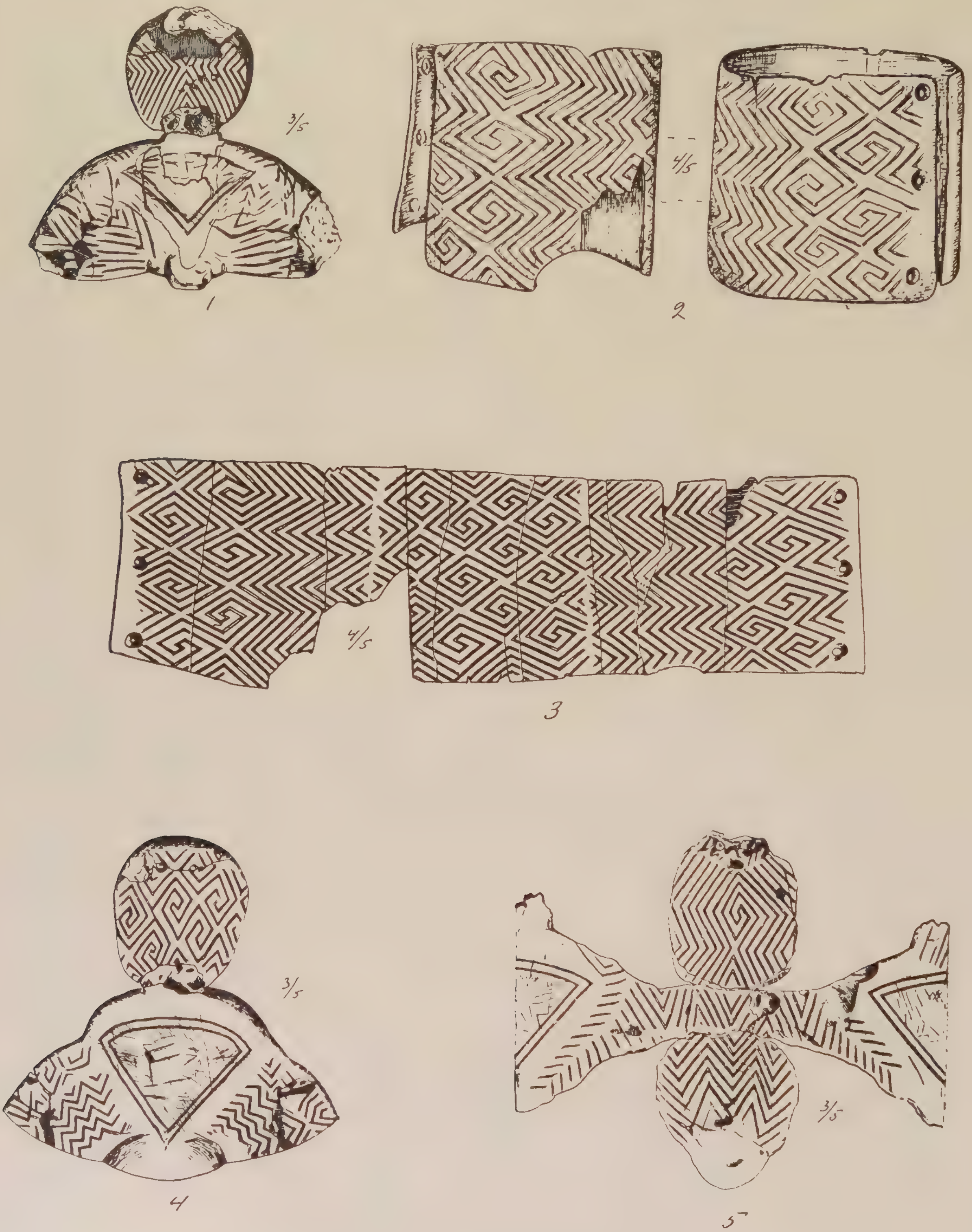
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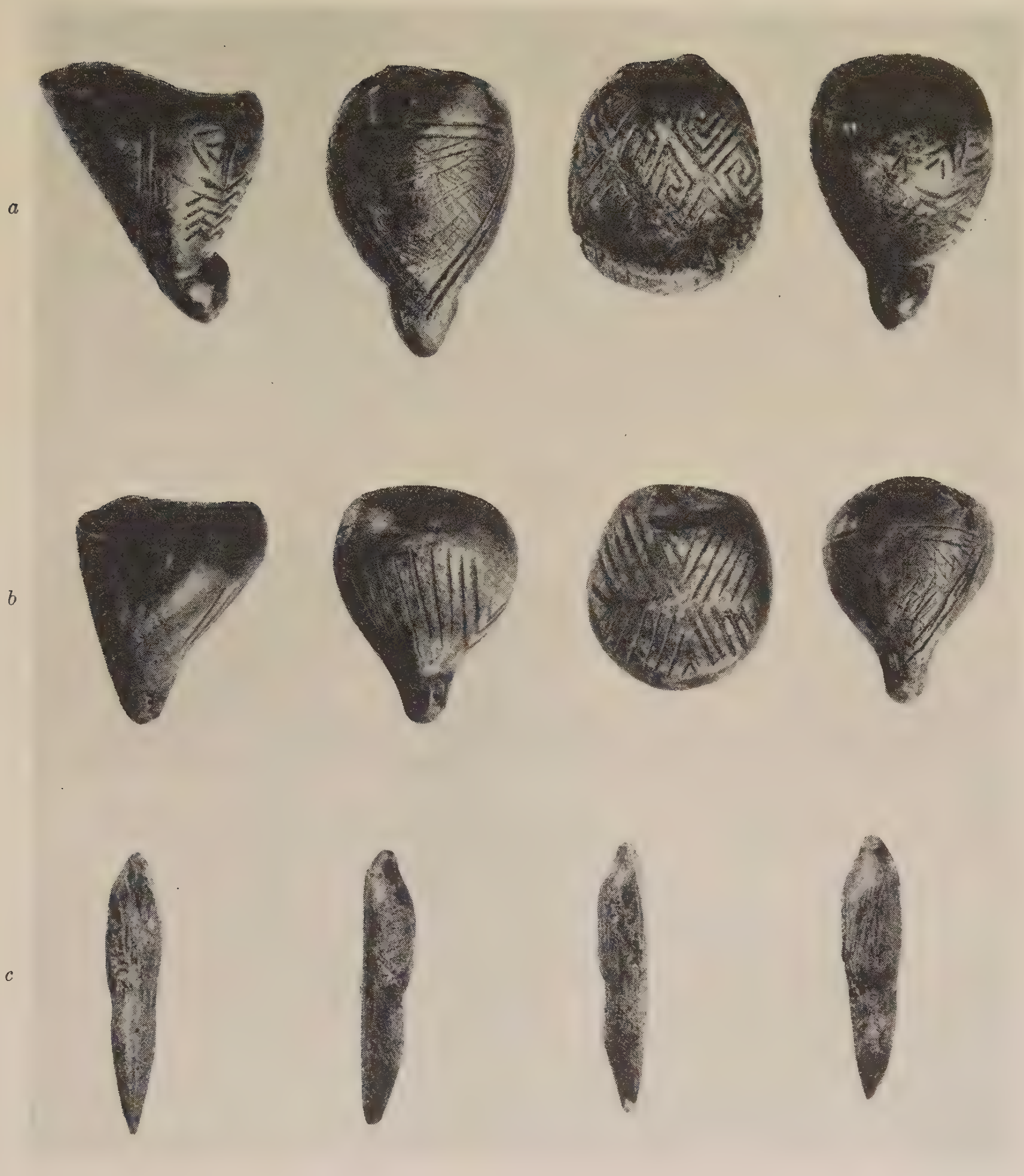
FIG. 59. Mezine Ivory. After M. Rudinsky.

PLATE XXVIII.



Ivory Sculptural Representations from Mezine. Photo from the casts in the University Museum, by author.

Rods.—There are four ivory rods carved in a series of roughly shaped spheres, spaced at more or less regular intervals (Fig. 58, nos. 16–18).[1]

Bracelet (Fig. 59, nos. 2, 3).—There is a bracelet made out of mammoth tusk which reveals an unusual degree of skill in workmanship. This superb example of the art of Mezine man is unparalleled in Western Europe. It has the form of a wide curved plaque, the ends of which almost meet, with three perforations on each end, possibly for lacing it on the arm. The entire surface is covered with very finely executed meander, romboid, and zigzag ornaments of unusual accuracy.

"Phallic Representation" (Figs. 60, 61).—Nine objects, made out of mammoth ivory, deserve special attention. As may be seen from the illustrations, they resemble bird beaks in form, especially when viewed in profile.[2] One can distinguish two parts, an elongated, slightly curved, tapering point and a shorter butt which starts with a rather abrupt swelling and gradually subsides to a blunt end. In at least one case (Fig. 60, no. 6) the longer part is nicely polished, the thicker end being roughly chopped, the very end showing the tracer of breaking from the original block.

There are usually two types of engraving: heavy deeper incisions which usually coves the side with the protuberance, and lighter, thinner lines which cover the flat side.

Rudinsky[3] distinguishes a combination of two principal motives in ornamentation which repeat themselves in all examples, differing in form:

1. An elongated figure which he called a "feather," above which are more or less pronounced traces of a second long figure, partly covered by the first motive, forming at the base a sort of sector.

2. The flat side is usually covered by geometrical ornaments, consisting of a series of double chevrons with their bases toward the pointed end (Fig. 61). These are sometimes replaced by rows of smaller chevrons, occasionally combined with straight lines and parallelograms.

It is hard to decide definitely what these objects represent. Volkov, while calling them provisionally "phallic representations," indicates the possibility of their being merely ornamented handles. Rudinsky does not commit himself as to their purpose but is inclined to see a purely ornamental motive of decoration, suggesting that its uniformity may represent a tribal, family, or artist's mark.

It was suggested by Breuil, Obermaier, and others that we have here very crude, or perhaps very much stylized, representations of human beings.[4] In this case the shorter, thicker figures would represent steatopygious women with the pronounced swelling representing the buttocks and the fine "geometrical ornament" on the flat side indicating the nose, eyes, breasts, thin arms and pubic triangle. On the other hand, the second group of thinner and longer objects would represent males with the same facial features, but with the swelling obviously less pronounced, and the "feather" of Rudinsky, depicting a very much exaggerated phallus. In both cases, the decorations of the other side would represent tattooing.

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[1] Compare ivory rods from Predmost. Breuil, H., "Voyage Paléolithique en Europe Central," L'Anthropologie, t. XXXIV, 1924, fig. 16, nos. 1 and 2.

[2] They are of two types: one long and thin, the other shorter and thicker. (E. G.)

[3] Rudinsky, M., "Bone Industry of the Palaeolithic Site of Mezine in Interpretation of T. Volkov," Ukrainian Academy of Sciences, Anthropological Laboratory of T. Volkov, Kiev, 1931.

[4] This description is more acceptable. (E. G.)

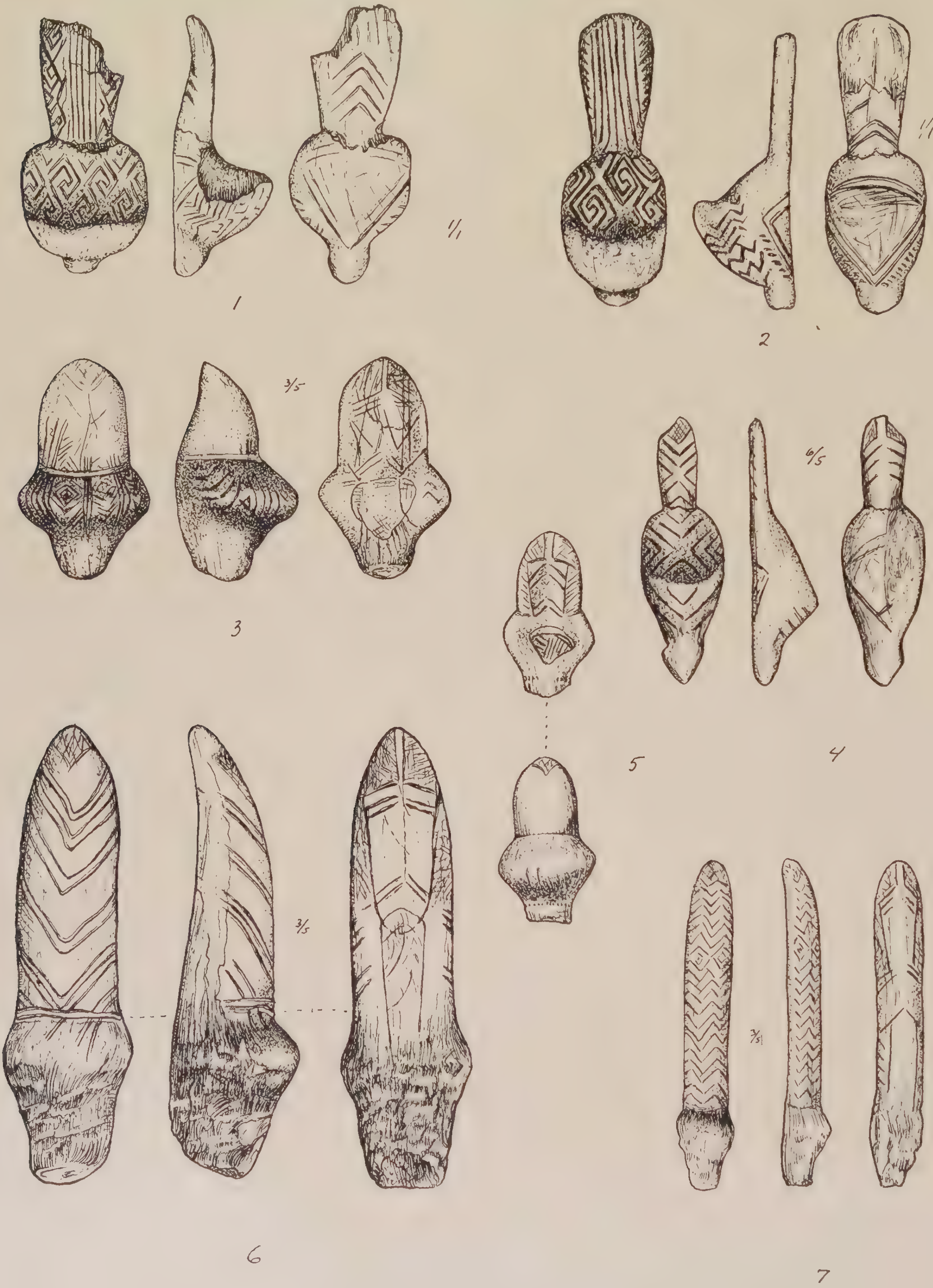
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FIG. 60. Mezine Ivory. Drawings from photos of M. Breuil and reproductions of Rudinsky.

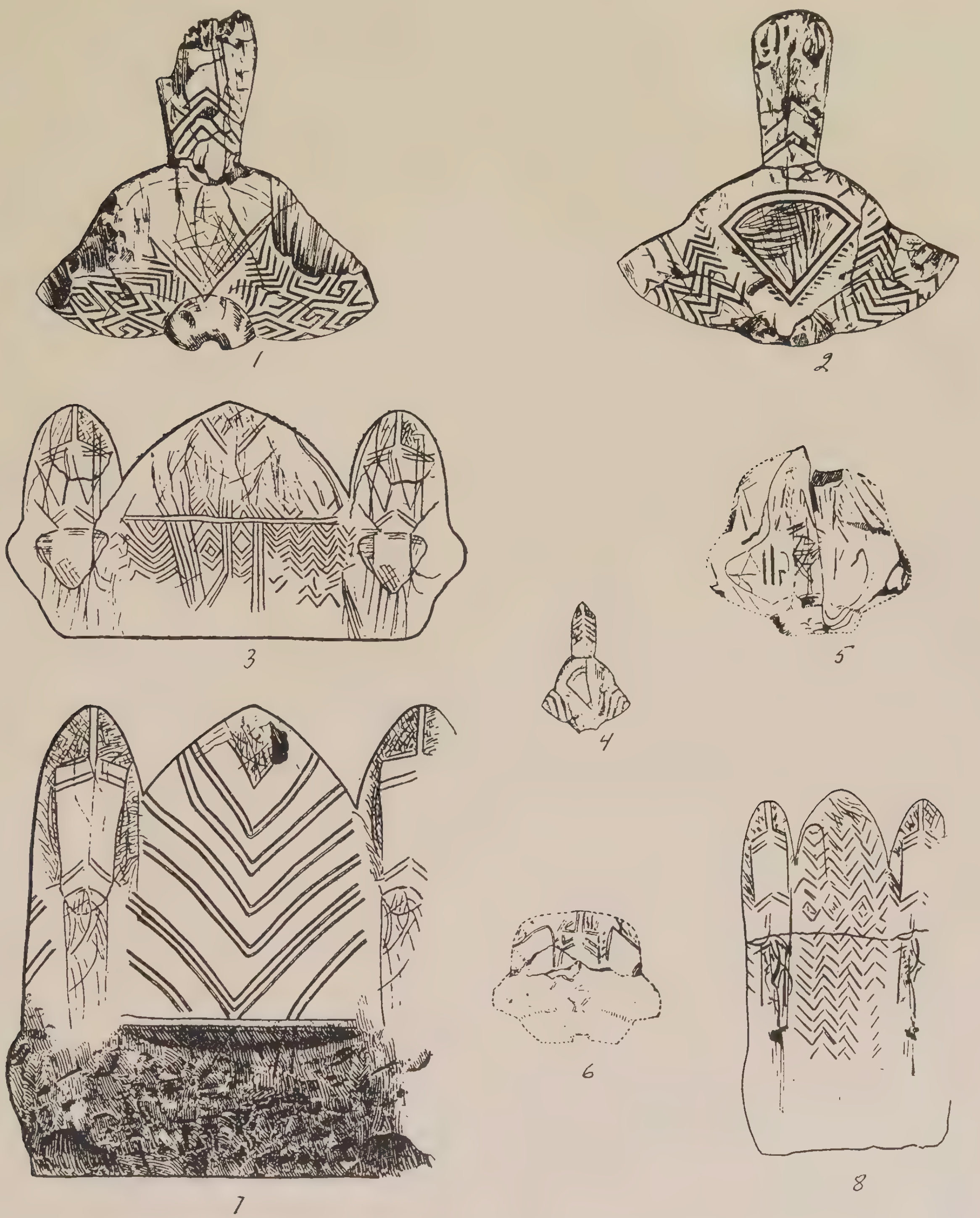

FIG. 61. Mezine Ivory. After Rudinsky.

Ephimenko does not accept this explanation as altogether proved, but, remarks, that either phallic, or anthropomorphic interpretation would fit into the general tendency of the art of the time (female representations).

Birds (Plate XXVIII, Figs. 59, 60, 61).[1]—Another series of very unusual objects were described as birds by most authors. They are made likewise of mammoth tusk and have very elaborate geometrical ornamentations.

Gorodzov states that several of them were found, but four are of special interest. Two of them are well preserved (Figs. 60, nos. 1, 2), and two have broken tails (Plate XXVIII). These "birds" are executed in a decadent conventional style, perhaps indicating a very wide distribution and a very long period of existence for this art.

The heads are barely indicated by adze-like protuberances without any details. The bodies are round, with softly outlined "breast" and "back" surfaces. The upper part of the "tail" is decorated with chevrons; below this in one case are perpendicular lines, in another a criss-cross geometrical design.

The breast and the end of the abdominal part is variously ornamented. The breast of one bird has a design of single lines drawn from the neck down, evidently representing the position of the feathers, while the lower part of the abdomen is decorated with four groups of chevrons with the apices pointing to a common center. Another one has on the breast and on the lower part of the abdomen a well-engraved Greek-key design.

However ingenious and suggestive the bird theory may be, it does not explain a number of features encountered. The animal motive is rare enough in the sculptural art of Palaeolithic man of European Russia, while the bird representation would be quite unique. The well pronounced triangle on the "breast" serves as a clue for our interpretation.

It seems more plausible to see in these "birds" much stylized female figurines, in which case the objects should be viewed upside down, as they are reproduced in (Plate XXVIII, Figs. 59, 60). The "swelling breast" then becomes the familiarly exaggerated buttocks; the tail—the upper part of the body with the usual tattooing on the back, (the "feather" of the first interpretation). The lack of details in the "heads" is then natural, as they represent only extremely schematicized legs tapering down to a point, a feature characteristic of the female figurines of Palaeolithic times. The well pronounced and otherwise unexplainable pubic triangle, as the only remaining, and therefore very much emphasized sexual attribute, completes the picture.

Dating.—The question of dating the Mezine site has received much consideration among Russian and Western European authorities. Thus, V. A. Gorodzov considers that the geological conditions of Mezine and Cyrill Street, Kiev, are very similar.

In the flint industry, the oblique gravers *burins busqué* and small blades sharply retouched on one side, similar in type to *La Gravette* are especially interesting for the purpose of dating. Both types appear for the first time in the upper horizon of the Aurignacian. Evidently, on the basis of these forms, Obermaier [2] considers that Mezine belongs to the end of the Aurignacian and the beginning of the Solutrean period. Still, continues Gorodzov,[3] these Mezine forms are not typically expressed and may be only survivals of ancient forms in later times.

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[1] In accordance with the anthropomorphic interpretation of the author, these figurines are reproduced upside down, contrary to the usual way. (E. G.)

[2] Obermaier, H., "Fossil Man in Spain," Yale University Press, 1925, p. 222.

[3] Gorodzov, V. A., "Archaeology, The Stone Age," Vol. I, pp. 232–239, Moscow, 1925.

Burkitt,[1] however, considers Mezine a specialized Upper Aurignacian culture which may have existed in Eastern Europe longer than in the West. While *La Gravette* points, and some gravers link it with the Upper Aurignacian of Western Europe, he feels that the bone work and the development of art "has no contemporaneous Western analogy." He is rather inclined to see a special Russian school of primitive art, with great emphasis on geometrical designs as found in Cyrill Street and Mezine, and notes the Russian influence in similar Predmost objects.

Both Volkov and Chikalenko date Mezine as Magdalenian.

Ephimenko, on the basis of the art development in comparison with Predmost, Kostenki I and Gagarino, assigns Mezine to the Solutrean-Magdalenian transition,[2] which fits into the accepted Russian scheme of unilinear development of culture.

8. Novo-Bobovichi

This site is located near the village of Novo-Bobovichi, on the right bank of the Iput River, 15 km. northwest of the town of Novozibkor, Klinzov district, Briansk region. According to Polikarpovich,[3] the finds of large animal bones by peasants, digging for a well attracted the attention of G. E. Giterman and D. P. Diatlov who visited the place and made a trial pit 6 x 9 meters. This resulted in the discovery of many mammoth bones showing the characteristic accumulations which are so typical of the Russian Upper Palaeolithic sites.

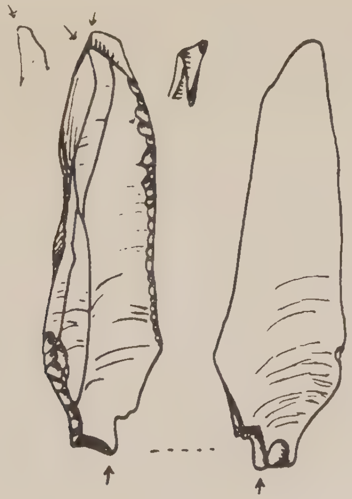

Fig. 62.

The pit is situated in the village, 70 meters above the level of the Iput River, on the bottom of a gully mouth, which opens into the river. It is 22 meters long and 5 meters wide.

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[1] Burkitt, M. C., "Prehistory," pp. 130.

[2] Menghin, O. ("Die Weltgeschichte des Steinzeit," p. 163), dates Mezine as Late Solutrean or early Magdalenian.

[3] Polikarpovich, K. M.; "The Palaeolithic Site of Novo-Bobovichi," Pratzi of Archaeological Committee of Bielorussian Academy of Science, Vol. II, pp. 491–494, Minsk, 1930.

The following stratigraphy was revealed:

1. Wash out material—0.15 to 1.0 meters.
2. Gray sandy loam and coarse grained sand with gravel—1.0 to 2.0 meters.
3. Gray-yellow sandy ferrous loam—2.0 to 3.0 meters.
4. Black, greasy cultural layer.
5. Green-gray, loess-like loam.

The cultural layer abounds in mammoth bones, about half of which belong to young animals. This is typical of the other Palaeolithic sites.

Industry.—The only implement found is a graver, made of dark-gray flint of chalk origin similar to that often found in the vicinity of the site (Fig. 62). It is madè on a three faceted blade, 6.78 cm. long, 2.05 cm. wide and 0.72 cm. thick. The upper pointed end has two facets of *burin* "*bec de flûte*" type; the lower one is a *burin d'angle.* On the lower face, traces of either a *burin* stroke or of reduction of the bulb are found. Along the right edge is fine steep secondary retouch. The left edge has a retouched notch suggesting *point à cran atypique,* which could be utilized later as a *burin.*

Dating.—On the basis of the above, Polikarpovich indicates Novo-Bobovichi to be an Upper Palaeolithic site but feels that further dating is impossible with such insufficient information.

9. UROVICHI

This site is located on the left bank of the Priepiat River, a tributary of the Dnieper, 20 km. from the town of Mazir. In 1929, during the course of archaeological work in the region, the attention of K. M. Polikarpovich [1] was attracted by the find of fossil animal bones. The trial excavation (5 square meters) established the presence of the cultural horizon with broken bones of very young mammoths and points of *La Gravette* types. These were found in the dark yellow sand which lay on a strata of greenish sands and was covered in turn by a series of light yellow sands.

In 1929, the Bielorussian Academy of Science delegated G. E. Giterman, S. A. Dubinsky, A. N. Lavdansky and K. M. Polikarpovich to further investigate this site. The expedition excavated an area of 30 square meters (5 x 6) and disclosed the following stratigraphy:

1. Dark gray layer—0.10 meters to 0.15 meters thick.
2. Light yellow loess with slight foliation—6.40 meters thick.
3. Diagonally foliated sands—4.80 meters thick.
4. Dark-yellow, fine grain sand which becomes bright green in the upper part.

The animal bones were encountered in a layer 0.5 to 0.6 meters thick in the middle of the fourth layer which is bordered by greenish sands.

Fauna.—The majority of the bones were those of *Elephas primigenius,* and a few *Equus* (sp.). As the material is now being studied, the complete list of fauna is unavailable. It has been established, nevertheless, that the majority of mammoth bones are those of young animals. The bones here, unlike those of Berdizh, are in a poor state of preservation.

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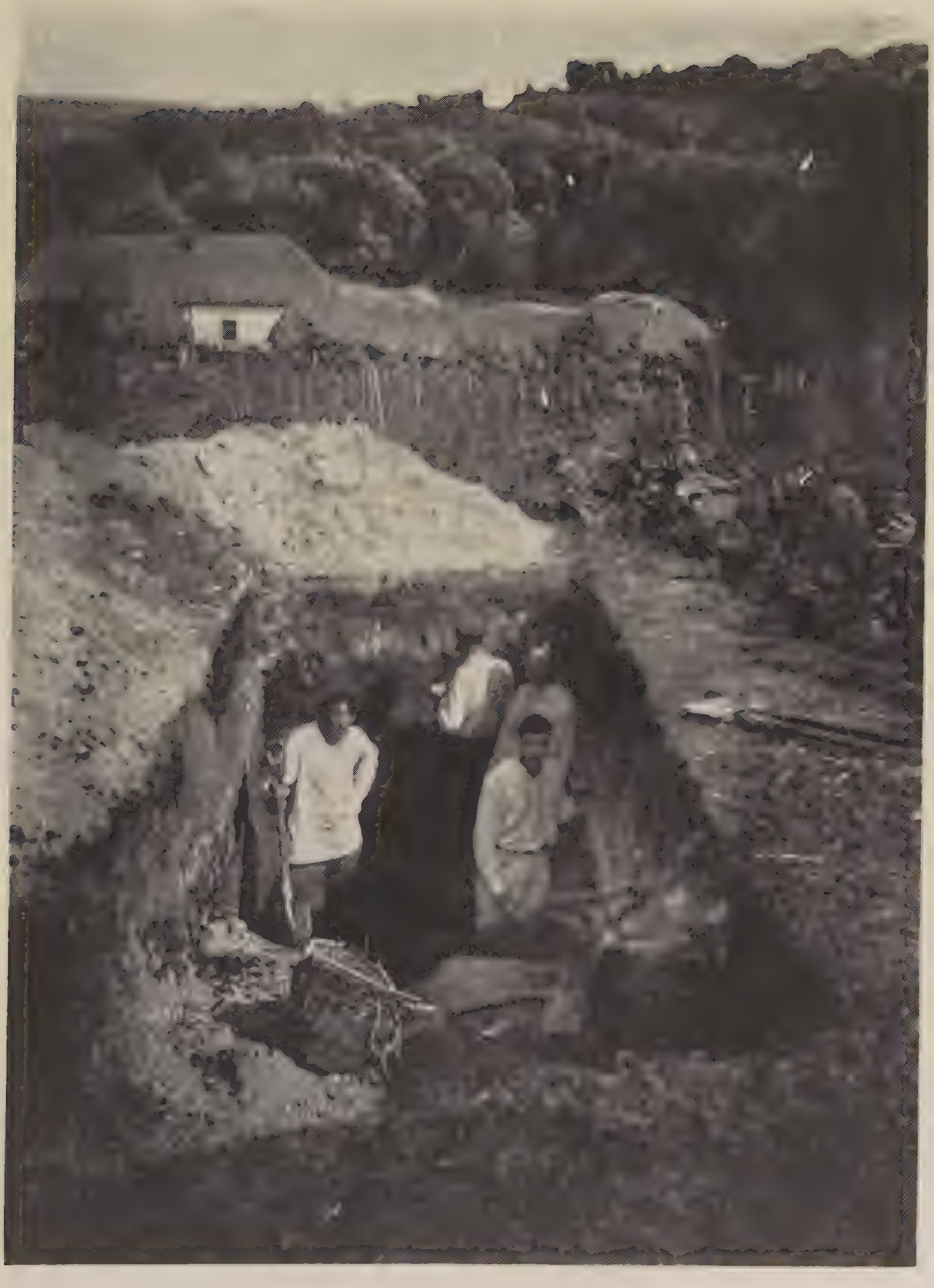
[1] Polikarpovich, K. M., "Excavation of Palaeolithic Site of Urovichi in 1929," Pratzi of Archaeological Committee of Bielorussian Academy of Science, Vol. II, pp. 499–501, Minsk, 1929.



Excavations in Kostenki II. Photograph of S. Zamiatnin.

Industry.—Besides the above mentioned two points of *La Gravette* type, four fragments of similar types, as well as one small flat flake, were found during the excavation.

Investigators believe that they have touched the very periphery of the site, the center of it being further south.

It was planned to continue the investigation in 1930, but no further information is available.

Dating.—Polikarpovich does not feel justified in assigning any more definite time than the upper Palaeolithic Age for this site.

10. Kostenki II

Kostenki II is situated on the northern side of the village Kostenki, Voronezh region, on the ancient terrace underwashed by the Don River. During construction work, animal bones and flint implements were found in the so-called "Anosov Log," next to the "Pokrovsky Gully," where the site of Kostenki I is situated.

The trial excavations of P. P. Ephimenko in 1923 [1] resulted in the discovery of a compact cultural layer, situated at the depth of two meters, between the layers of loam and sand. It contained a large quantity of animal bones, mostly those of mammoth, and occasional stone implements. The small quantity of tools found precluded the possibility of definite dating at that time.

Subsequent excavations by S. N. Zamiatnin in 1927 [2] confirmed the preliminary investigations. The excavators assumed, on the basis of their previous experiences, that they were dealing with one of the conglomerations of bones, which in this region accompany the hearths. Consequently, several trial pits were made, resulting in the discovery of the remains of a hearth almost immediately next to the pit made in 1923. It had an aspect typical of the sites of this region and a very rich cultural content. About two hundred flint tools, a number of bone objects, flint chips, split and charred bones, and pieces of ochre were found there.

While this preliminary report by Zamiatnin does not give any details, Gromov [3] lists the following fauna:

Elephas primigenius, numerous
Sus scrofa, few.
Equus (*equus*).
Ovibos moschatus.
Alopex lagopus (?).
Felis sp. (*leo?*).
Marmota sp.
Lepus sp.
Ellobius talpinus.

The conglomeration of bones was, as usual, situated around the edge of the "hearth." According to Vishnevsky,[4] the forms of stone implements were different from those of Kostenki I, and were made of red, rather than black, flint.[5]

[1] Ephimenko, P. P., "Pre-Clan Society," Leningrad, 1936, p. 431.

[2] Zamiatnin, S. N., "The Expedition for the Study of Palaeolithic Cultures in 1927," Soobschenia of GAIMK, 1929, Vol. II, pp. 210–211.

[3] Gromov, V. I., "Geology and Fauna of the Palaeolithic Period in U. S. S. R.," Problems of the History of Material Culture, No. 1–2; Leningrad, 1933.

[4] Vishnevsky, B. N., "Pre-Historic Man in Russia" (Appendix to the translation of Osborn's "Men of the Stone Age," Leningrad, 1924, p. 460).

[5] Unfortunately, no further details or illustrative material pertaining to the stone industry of Kostenki II are available to the author (E. G.).

Ephimenko [1] dates this site, as well as the Kostenki III, as early Magdalenian on the basis of the general archaic, decadent character of its industry which, in his opinion, is a degeneration of Aurignacian-like technique in Magdelenian times.

11. Kostenki III

This site was discovered by P. P. Ephimenko in 1923 on the northern border of the village of Kostenki, Voronezh region, in the so-called "Glinistche" on the high bank of the Don River. Here the river approaches the high shore and washes out the ancient terrace, thus considerably damaging the site. At present it occupies a small plateau bordered on one side by the shore slope which, gradually elevating, reaches the heights of the right bank of the Don.

The trial excavations produced very little material. Further excavations in 1926 by Ephimenko, and in 1927 by Zamiatnin, were made next to the pit opened in 1923. A total of forty square meters was uncovered.

According to Ephimenko,[2] the natural cut of the shore near the spot where the cultural remains were found, shows the following profile:

I. Thick layer of humus.
II. Light-yellow loess-like loam.
III. Compact, yellow-gray loam with lime concretions. In this layer, at the depth of 180–190 cm. from its surface, were found the cultural remains.
IV. Gray layer with sand lenses—of earlier glacial times.

The cultural layer was colored red, due to the presence of ochre. Flint implements and a quantity of small broken animal bones were very unevenly spread over the opened area.

Fauna.[3]

Elephas primigenius, numerous.
Sus scrofa ferus.
Equus (*equus*).
Ovibos moschatus.
Canis lupus, numerous.
Alopex lagopus, numerous.
Ursus spelaeus.
Marmota sp.
Lepus sp.
Ellobius talpinus.

The fauna, in which the mammoth predominates, is similar to that of Kostenki I, with the addition of the Arctic fox.

Stone Industry.

Unlike Kostenki I, where only dark flint of chalk origin and of very good quality was used, 25–30 per cent. of the implements of Kostenki III were made of red and yellow pebble flint, much inferior in quality.[4] The flint industry (one hundred finished tools and a large number of blades and chips) is rather poor as to variety of types. The blades and

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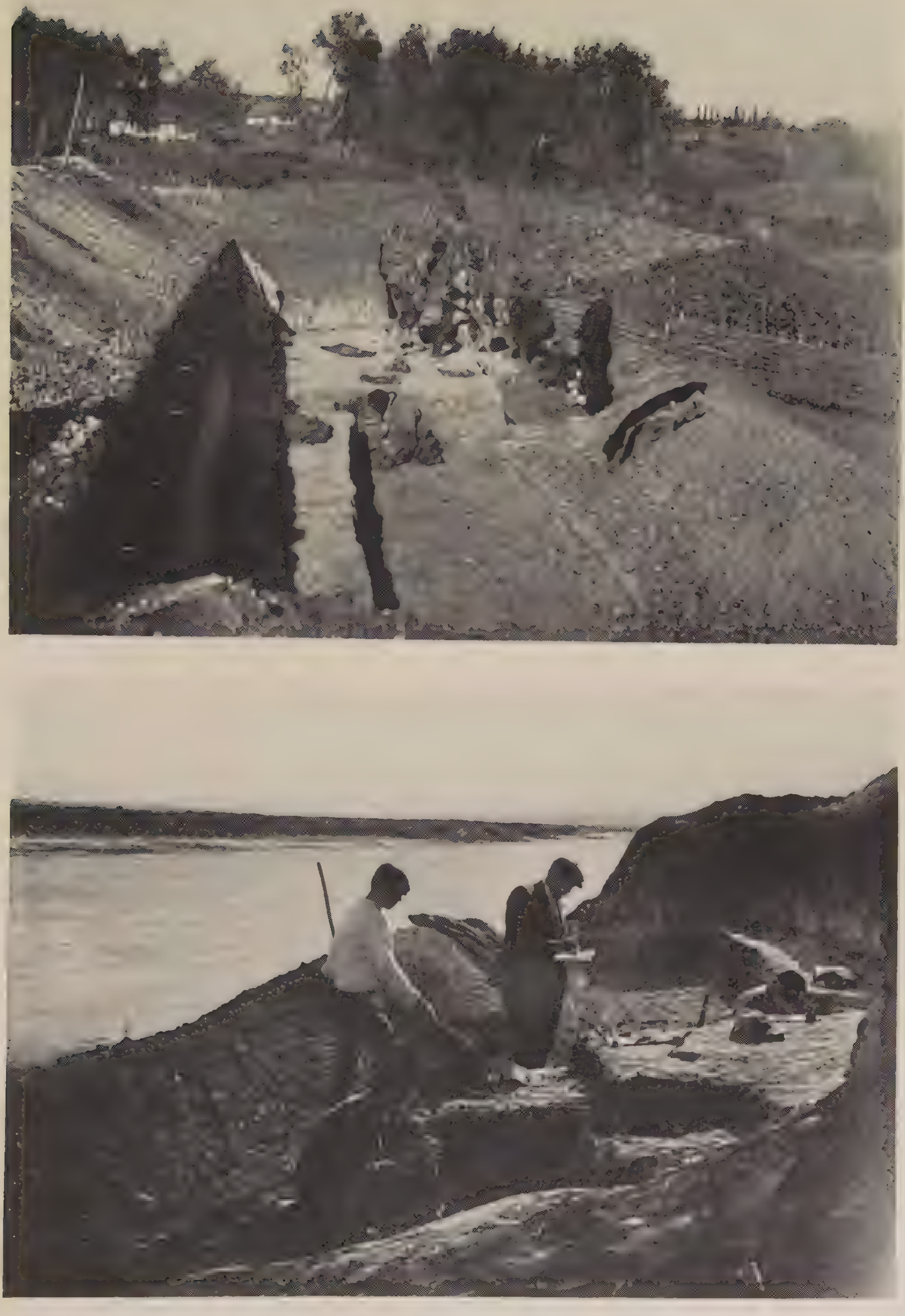
[1] Ephimenko, P. P., "Some Results of the Study of the Palaeolithic Period in U. S. S. R.," "Chelovek," No. 1, Leningrad, 1928, pp. 54–55; also "Pre-Clan Society," Leningrad, 1936, p. 346.

[2] Ephimenko, P. P., "Pre-Clan Society," Leningrad, 1936, pp. 429–431.

[3] According to Gromov, V. I., "Geology and Fauna of the Palaeolithic Period in U. S. S. R.," Problems of the History of Material Culture, No. 1–2, Leningrad, 1933.

[4] Menghin, O. ("Die Weltgeschichte des Steinzeit," p. 173), thinks that the use of glacial pebble flint indicates "the culture which has arrived from the north."

PLATE XXX.



Excavations at Kostenki III. Photograph of S. Zamiatnin.

finished tools are very small, the largest rarely over 5 cm. Blades of regular form are absent. The tools are usually irregular, made on rough, wide, and massive blades. The majority of the implements are middle and side gravers of rather crude technique. There are many polyhedric forms. Ephimenko definitely stresses the unusual paucity of types; with the exception of gravers, which constitute 90 per cent. of all tools, only small end-scrapers and nucleus-like tools of the *rabo* form were found.

Bone Implements.

Many bone implements were found, but they are not characteristic for dating. There are awls made from tubular bones, and one point of mammoth tusk, round in cross-section. Further details are not available.

Comparing this site with Kostenki I, Ephimenko adds:[1] "In general, the industry is much more crude, primitive, monotonous, and tools are smaller, clearly showing the decline of skill in flint work, and poor choice of material, which, in Western Europe, is characteristic of early Magdalenian. It impresses the observer with its crudity and archaism. It seems to be representative of the culture of a backward people arriving probably from the north (as suggested by the presence of pebbles), and replacing the Solutrean inhabitants of Kostenki I. This industry seems to be a survival in Magdalenian times of the exceedingly poor and degenerated industry, similar in its general character to that of the Aurignacian."

Dating.—On the basis of the "degeneration of technique" and the monotonous character of the industry, Ephimenko [2] dates Kostenki III as Magdalenian.

Menghin [3] considers Kostenki II and III a degeneration of Aurignacian technique, admits the possibility of influence of "bone cultures," and is inclined to derive this culture from the north, due to the use of "poor glacial flint." He considers the industry of Kostenki II and III similar to that of Karacharovo (see page 360) but somewhat younger.

12. MEKAMET CAVE (VIRCHOW'S CAVE)

This site is situated near Motzamet (Mekamet) monastery, Kutais region. It is known in literature as Mekamet or Virchow's Cave.

According to Vishnevsky,[4] it was discovered, in 1914, independently, by S. Kozlovsky and R. R. Schmidt. The latter asserts that the flint industry is similar to the late Aurignacian of Western Europe. According to Field and Prostov,[5] the types of flint industry were published by Nioradze,[6] who states that, "the excavations at Rudolf Virchow's Höhle have yielded Upper Palaeolithic cultures, mainly Aurignacian" (Fig. 62*a*).

Ephimenko [7] states that here, as well as in other Palaeolithic stations of the Transcaucasus, obsidian, which was the basic material for the neolithic industry, was not used at all, its place being taken by colored flint. The types of implements vary but little: there are flakes with retouched sides, scrapers, and gravers, which by their archaic form remind one of Kostenki II and III. It is interesting that with these are met the nuclei-like forms of the *rabo* type, found also in the Voronezh sites. Characteristic of Mekamet cave, in comparison with the former group, are the flakes with retouched sides which here vary greatly in shape. Their forms remind one of the very early geometrical microliths in the stations of the Southern Mediterranean province of the Upper Palaeolithic of Western Europe.

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[1] Ephimenko, P. P., "Some Results of the Study of Palaeolithic Period in U. S. S. R.," "Chelovek," No. 1, Leningrad 1928, pp. 45–59.

[2] Ephimenko, P. P., "Pre-Clan Society," Leningrad, 1936, p. 430.

[3] Menghin, O., "Die Weltgeschichte des Steinzeit," p. 173.

[4] Vishnevsky, B. N., "Prehistoric Man in Russia" (Appendix to the translation of Osborn's "Men of the Old Stone Age"), Leningrad, 1924, p. 470.

[5] Field, Henry, and Prostov, Eugene, "Recent Archaeological Investigations in the Soviet Union," American Anthropologist, Vol. 38, No. 2, 1936, pp. 262–264.

[6] Nioradze, G. K., "Das Paläolithicum Georgiens," Transactions, Second International Conference of the Association on the Study of the Quaternary Period in Europe, Facsimile 5, Leningrad, 1935, pp. 225–236.

[7] Ephimenko, P. P., "Pre-Clan Society," Leningrad, 1936, pp. 492–493.

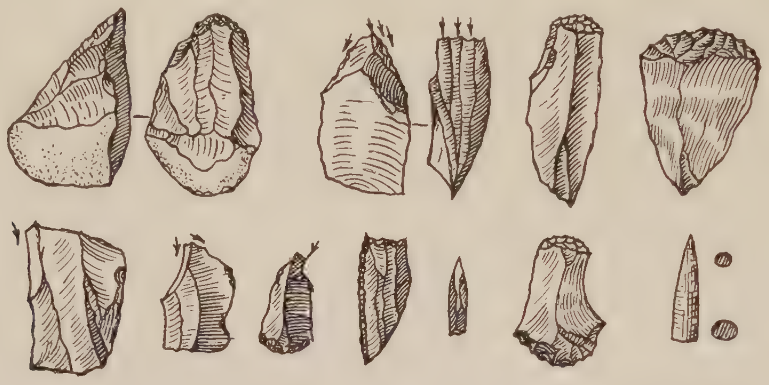

FIG. 62*a*. Stone Implements at Virchow's Cave. After Field and Prostov.

Dating.—Both Ephimenko and Zamiatnin, who has made an extensive study of Caucasian Palaeolithic cultures, classify Mekamet Cave with the middle period of Upper Palaeolithic cultures, which corresponds to Solutrean and Early Magdalenian. They both feel that no definite Western European parallels can be found, and stress the lack of characteristic types and the gradual changes, which took place throughout the Upper Palaeolithic period in the Caucasus.

Uvarov's Cave, Bartashvilli Cave, and Devis Hvreli (see page 293) belong to the same cultural division.

13. KARACHAROVO

Location.—The site of Karacharovo is situated near the estate of Count A. S. Uvarov, north of the village of Karacharovo, two kl. above the town of Murom, Vladimir province, on the Oka River.

The high bank of the Oka is cut here by a number of gullies leading to the valley of the river. Among the largest are the Melemkov gully, south of the village; the Karacharovo gully, between the village and the estate; and the Buhchinsk gully, at the southern end of Murom.

Discovery and History.—The site was discovered in 1877 by A. S. Uvarov, whose attention was attracted by the finds, in Karacharovo gully, of mammoth bones which were washed out by spring waters. Two other gullies proved to be also ossiferrous. Uvarov's excavations, in which the geologists V. B. Antonovich and I. S. Poliakov participated, resulted in the discovery of a cultural layer with more than 500 stone artifacts.[1]

The literature on Karacharovo is very large, but due to the fact that the technique of excavating was far from perfect, and that the untimely death of Uvarov prevented him from publishing a complete account of his find, this site was somewhat neglected and the collection scattered.[1]

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[1] Uvarov, A. S., "The Archaeology of Russia. The Stone Age," Moscow, 1881, Vol. I, pp. 112–120.

The question of the geological age of the Karacharovo deposit was more or less settled by prominent scientists who examined the site at the invitation of Count Uvarov.

Geology.—V. V. Dokuchaev [2] gives the following picture of the nearby vicinity: the basic formation is (I) the Permian limestone in which here and there Jurassic deposits have been preserved; it is followed by (II) a layer of cross-bedded fluvio-glacial sands, at times containing pebbles. Next follows (III) a brown-red moraine clay with pebbles. Above this is (IV) yellow loess-like clay covered at times by (V) a thin layer of sand.

At the site itself, situated on the left slope of the Karacharovo gully under the layer of humus, was a yellow, sandy, loess-like clay, two to three meters thick, which contained the cultural remains. Beneath it was red pebble clay. The observations of Poliakov [3] showed that in the natural cut of the gully the layer of loess-like clay gradually increases toward the river, decreasing toward the head of the gully, where it disappears. On the other hand, the red pebble clay increases in the direction of the gully. The cultural remains were found in the layer of diluvial (?) loess-like clay. The pebble clay, which is cut by diluvial action is a moraine of the maximum (Riss) glaciation.[4]

Fauna.—The fauna is represented by the remains of the following animals:

(*a*) *Elephas primigenius.*
(*b*) *Rhinoceros tichorhinus.*
(*c*) *Bos* sp.
(*d*) *Cervus* sp.

Cultural Remains (Figs. 63, 64, 65).—The most complete description of Karacharovo is given by S. N. Zamiatnin,[5] who has made a thorough study of the available literature and collections.[6] The following is a more or less full extract of the above work:

The size of the excavated area is small. The cultural remains lay 1.5 meters from the surface in the lower part of the yellow loess-like clay (50–60 cm. above the moraine clay) and present a picture usual for Russian sites: a conglomeration of various animal bones mostly broken to extract the marrow, with pieces of flint, implements, and small pieces of charcoal.

According to Poliakov,[7] most of the bones and flint implements were found in a small area of 1.5 square meters. Outside of this area separate pieces of bone and flint tools were encountered, widely scattered. Thus, evidently, most of the finds came from one hearth.

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[1] Zamiatnin, S. N. ("The Palaeolithic Site of Karacharovo"), indicates three specimens in the State Historical Museum in Moscow, twelve in the Anthropological Department of the First Moscow University, sixty-five in the Museum of Anthropology and Ethnography in Leningrad, fifty-six in the Geological Department of Leningrad University, fourteen in the Museum of Kiev University, a few in Kazan Museum, and perhaps a few in Poland and Czechoslovakia.

[2] Dokuchaev, V. V., "The Archaeology of Russia by A. S. Uvarov," Trudi of the St. Petersburg Society of Naturalists, St. Petersburg, 1882. Vol. XIII, pt. I, p. 54.

[3] Poliakov, I. S., "Investigations of the Stone Age in Olonetzk Province, in the Valley of the Oka River, and the Upper Part of the River Volga," Zapiski of the Russian Geographical Society, Division of Ethnography, St. Petersburg, 1882, Vol. XI, p. 121.

[4] Malycheff, Vera, "Le Loess" (Review de Géographie Physique, Paris, 1929–30, t. II–III, p. 271), writes "Leurs conditions de gizement ne sont pas précisés, mais il est fort probable que les industries se trouvent ici dans des dépôts contemporains de la partie supérieure du conflexe récent." (Young loess. E. G.)

[5] Zamiatnin, S. N., "Palaeolithic Site of Karacharovo."

[6] Figs. 63 and 64 are reproduced from the above work of Zamiatnin; Fig. 65 from Sawicki, who gives some additional types. (E. G.)

[7] Poliakov, I. S., "Investigation of the Stone Age in Olonetzk Province, in the Valley of the Oka River and the Upper Part of the River Volga," Zapiski of the Russian Geographical Society, Division of Ethnography, Vol. IX, St. Petersburg, 1882, p. 121.

The implements of Karacharovo were made of local Permian flint, usually yellow-brown in color with red or gray spots, though some are dark-rose, light gray or yellow. The flint is homogeneous in structure without incrustations. It is encountered in the form of pebbles in the underlying moraine layer. A few tools were made of a hard, white sandstone and diorite.

Nuclei.—Nuclei are quite numerous, according to Uvarov and Poliakov, but only four are found in collections. They are of irregular prismatic form with one surface of percussion, small in size (4–6 cm.), and very much worked. No nuclei corresponding to the large flakes of the collection were found.

Flakes.—Flakes are usually large, short, and wide, often preserving the original surface of the core. The smaller ones were called by Uvarov "scrapers," and the large ones "axes." No small flakes and products of secondary retouching are found in collections. Though found in abundance, due to the methods of excavation they were not preserved.

Blades.—Blades are usually 6–7 cm. long, quite wide and often slightly curved. A few specimens are larger (10–11 cm.). Most of the best large examples are improved along one or both edges by fine retouch (sometimes also on the lower, flat side) or show traces of utilization [1] (Fig. 63, nos. 1–3). Several blades are chipped on one end by detaching large flat flakes, so that the working edge looks like a planing tool (gouge) (Fig. 64, nos. 34–36).[2]

The dented blade (*lame dentelée*), used for the preparation of bone tools (Fig. 64, no. 38), is made on a wide flake, and has three semi-circular notches on the right edge.

Gravers.—Gravers (Fig. 63, nos. 4–8, 11–16) are the most commonly used tools, and include middle gravers, side gravers, angle gravers (Fig. 63, nos. 4, 5, 7, 8), and double gravers (Fig. 63, no. 6). The number of graver flakes found (Fig. 63, nos. 9, 10) indicates the extensive use of these implements.

Scrapers.—Scrapers of two types were found: (1) Large end scrapers made on the end of a long blade, the form usual for the Upper Palaeolithic in general (Fig. 64, nos. 22–25, 31), (2) small scrapers of peculiar form and of several types: (*a*) Small, made on a short wide flake (Fig. 64, nos. 21, 26, 30); (*b*) made on a broken blade (Fig. 64, nos. 20, 22, 32); (*c*) small round scrapers (Fig. 64, nos. 27, 28).

According to Zamiatnin, all types of this second group are found in large quantity in Gontzi and also in Borshevo II, where they constitute leading forms.

Some scrapers of the first, as well as the second of the above groups, do not have a regular arc-like edge, but are somewhat elongated or sharpened. The working edge of these tools (Fig. 64, no. 31, lower and 37) has a steep, dulling retouch often made at an obtuse angle to the lower surface, which makes the use of them as scrapers impossible. Consequently it is rather a preparatory stage of the scraper than the tool itself.[1]

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[1] Zamiatnin refers to the chipping of what appears to be the base. (E. G.)

[2] Zamiatnin compares them with similar blades, described by P. P. Ephimenko in Kostenki I ("The Palaeolithic Site of Kostenki," Annual report of Russian Anthr. Soc., Vol. V, pp. 22–23) where they are well represented. He also indicates that H. Breuil ("Voyage paléolithique en Europe Central," L'Anthropologie, t. XXXIV, pp. 529–30) calls attention to the large number of these tools encountered in the flint industry at Predmost (Moravia) and points out that their abundance is characteristic of East-European sites.

Perforators.—Perforators are represented by two examples (Fig. 64, nos. 29, 37). One is made on the end of a long blade with a finely retouched edge. The other is made on a rough, massive, flake, and the point may, or may not, have been accidental.[2] To the same class, perhaps, belongs the group of tools with natural points, slightly improved by the retouch.

Bifaces.—The tools with bifacial retouch are very interesting. The two most typical are shown on Fig. 64, nos. 18 and 19. The first (Fig. 64, no. 18) is made of flat, wide, leaf-shaped flake with a pronounced point; the upper surface is retouched with small facets; the lower surface has several larger facets, and secondary retouch along one edge. The second example (Fig. 64, no. 19) is oval and very massive. It has the same characteristic features—the lower, flat side is retouched with large facets, the upper side is very convex, is worked over with smaller and longer facets, and has secondary retouch. Two other examples of bifacial technique are the rough "hand-axes" and are less characteristic. They may be placed in the same class with the rough laurel-leaf points of Predmost.[3]

The following implements are reproduced on Fig. 65 from Sawicki's illustrations of artifacts.

1. Same as Zamiatnin (Fig. 63, no. 2).
2. Same as Zamiatnin (Fig. 64, no. 38).
3. Thick flake with partial retouch on one end.
4. Fragment of a wide blade.
5. Same as Zamiatnin (Fig. 64, no. 30).
6. Same as Zamiatnin (Fig. 64, no. 24).
7. Long blade with some evidence of retouch on one edge.
8. Same as Zamiatnin (Fig. 63, no. 1).
9. Long blade with blunt retouch along one edge.
10. Same as Zamiatnin (Fig. 63, no. 8).
11. Same as Zamiatnin (Fig. 63, no. 13).
12. Same as Zamiatnin (Fig. 63, no. 13).
13. Same as Zamiatnin (Fig. 64, no. 27).
14. Same as Zamiatnin (Fig. 63, no. 12).

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[1] It was suggested by Mrs. Kelley, that what Zamiatnin calls the working edge may be a blunting of a base, in which case Fig. 34, No. 7, would be basal fragments of other tools.

[2] Neither of the two tools mentioned could be accidental, and they appear to be points rather than perforators, at least as much as one can judge from the illustrations, which do not show the characteristic wear. (E. G.)

[3] Zamiatnin again refers to H. Breuil (*op. cit.*, pp. 523–525), who points out their massiveness, the convexity of the upper side, and the flatness of the lower, which is retouched by large facets and has no secondary retouch on the edges, as the peculiarity characteristic for these tools. H. Breuil thinks that the rough leaf-like point of the Hungarian Solutrean has developed from the small *coup de poing* of the Eastern Mousterian. In this connection Zamiatnin points out the find in Berdizh, in 1928, of a typical Mousterian *coup de poing* in the characteristic industry of the final Aurignacian.

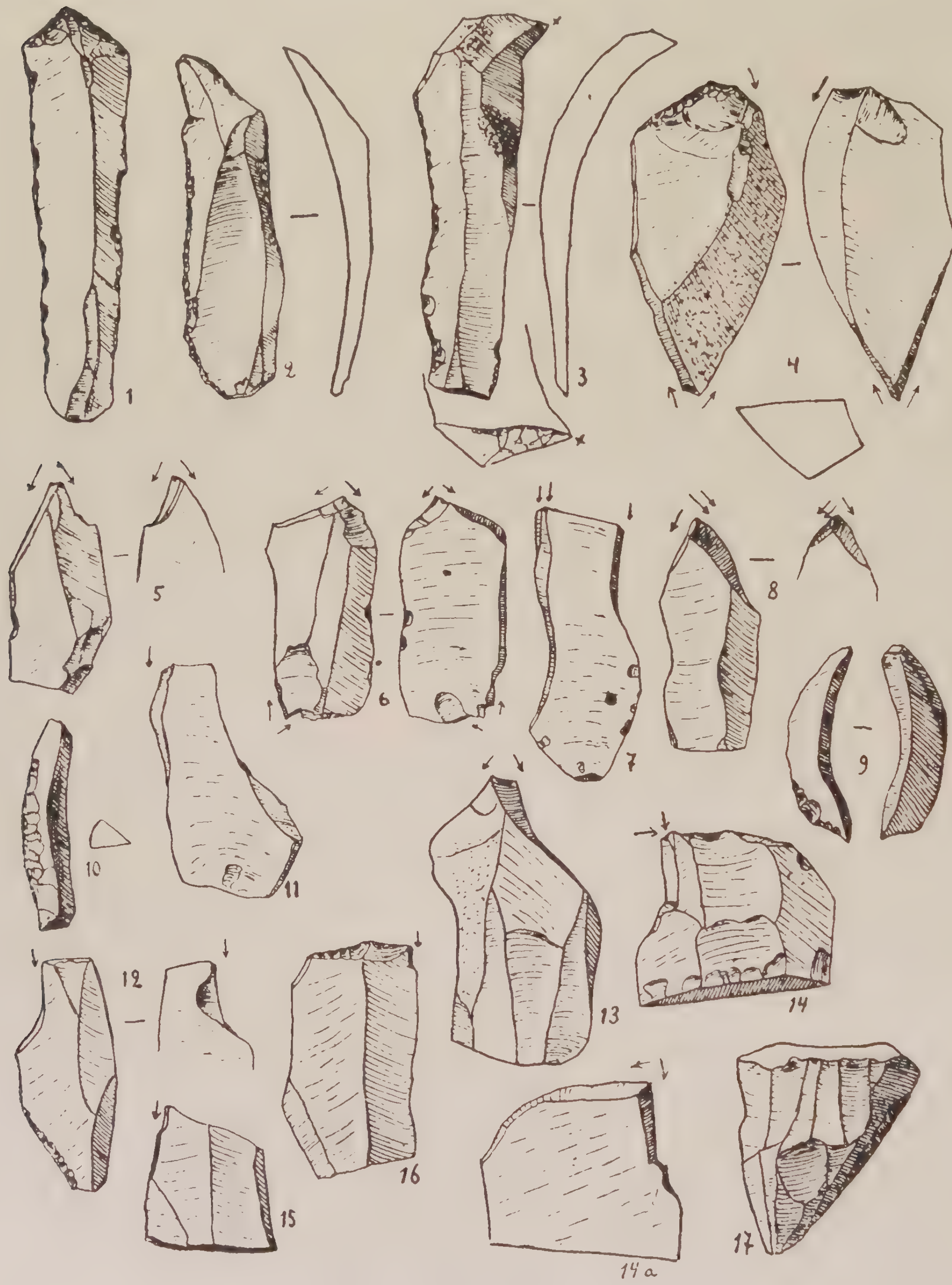
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Fig. 63. Stone Industry of Karacharovo. After S. Zamiatnin.

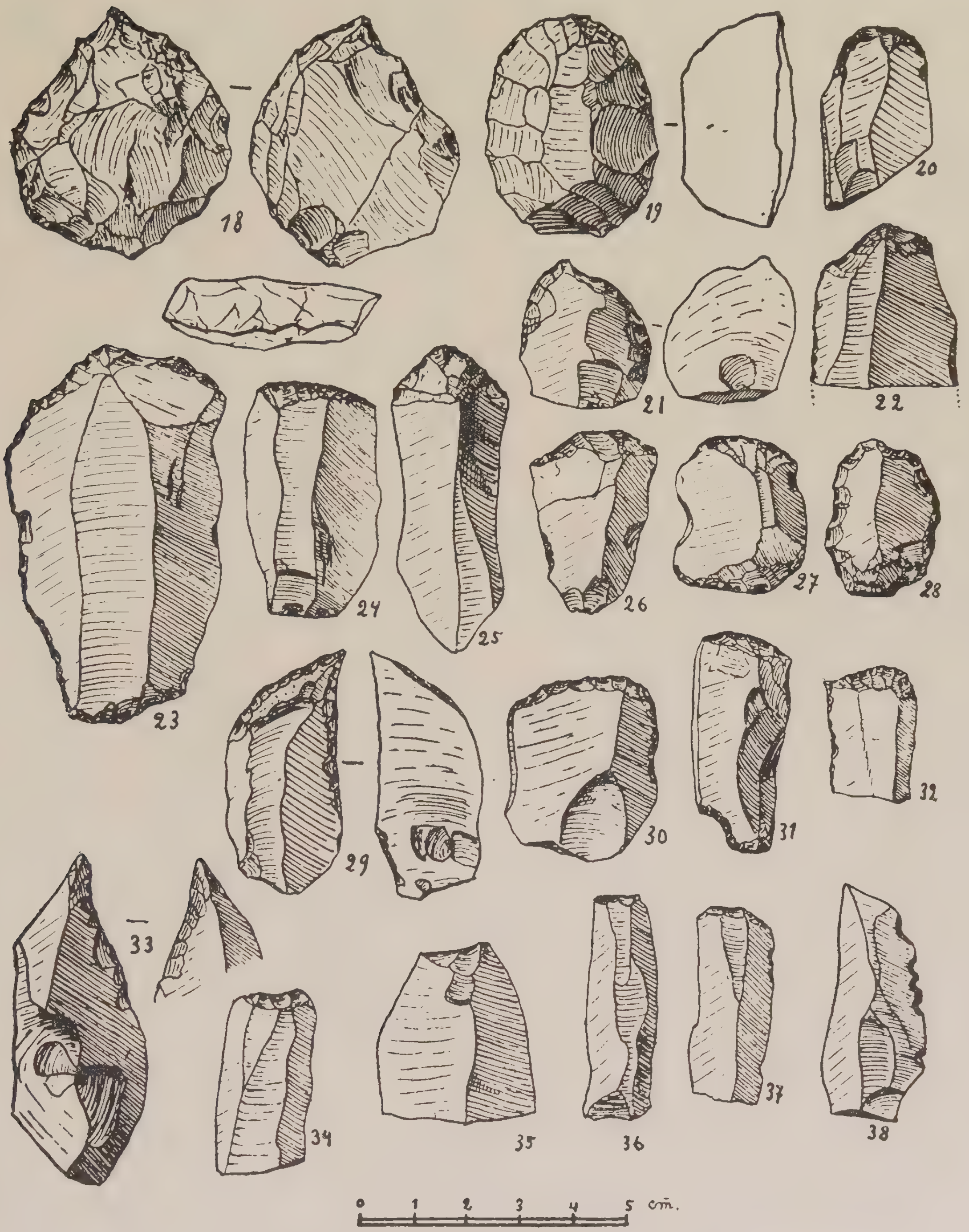
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Fig. 64. Stone Industry of Karacharovo. After S. Zamiatnin.

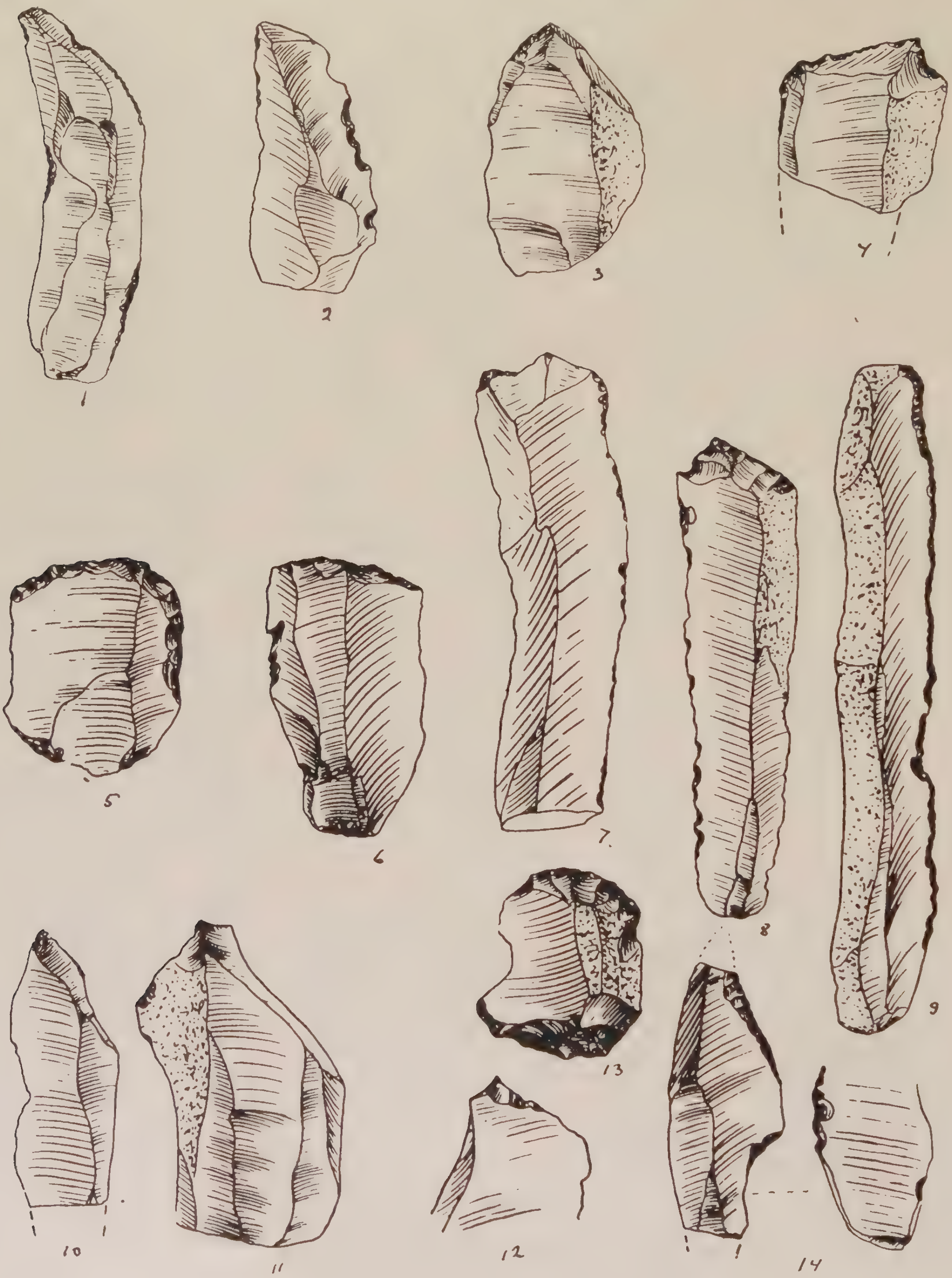
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Fig. 65. Stone Industry of Karacharovo. After L. Sawicki.

Bone Work.—The complete absence of examples of bone work, as well as of certain types of flint tools, should be attributed, in the opinion of Zamiatnin, to the defective technique of excavating, as well as to the fact that the material has passed through several hands during which time some of it may have been lost.

Dating.—There is no possibility of dating Karacharovo on the basis of geological data, as it does not furnish a close enough criterion. Likewise the faunal material is undoubtedly incomplete. A possible hint for the dating may be seen in the presence of remains of the Siberian rhinoceros. This animal died out before the mammoth and is not found in a number of other sites which abound in Probiscidean remains. Beyond this fact the only remaining criterion for dating Karacharovo is its flint industry. L. Sawicki [1] considers the general character of the flint work of Karacharovo to be similar to that of Borshevo II, Gontzi, and Cyrill St. and, therefore, he dates Karacharovo as Aurignacian.

According to Zamiatnin, however, this can hardly be accepted. He points out that the fine, beautifully made tools of the latter sites differ markedly from Karacharovo, where the tools are more massive and larger; the blades as a rule do not have parallel sides and are much wider, all of which gives them a more archaic character. The only form which seems to connect Karacharovo with Borshevo II and Gontzi, is the type of scraper (Fig. 64, nos. 27–28), which is round and short. This similarity is not decisive, as in Karacharovo these scrapers do not predominate as they do in Borshevo II and Gontzi. It should also be pointed out that this form in smaller quantities is found in earlier sites such as Kostenki I, Predmost, in the Upper Aurignacian horizon of Lacoste, La Ferrassie, etc.

The gravers are of little use for dating, though the absence of the polyhedric form should be noted. Some help can be derived from the blades with the transverse flaking of the edge (Fig. 64, nos. 34–36). The evolution of this type can be followed from the characteristic specimens of Kostenki I, made on a long blade with the carefully chipped end forming the concave edge, through a number of intermediate stages to *pièce esquille* of Kostenki II and III. The forms of Karacharovo occupy an intermediate position.

It is the presence of the bifacial technique which, in the opinion of Zamiatnin, should be considered decisive for dating. Unfortunately the series represented is small, and as far as can be seen from the material at hand it represents a later stage, the degeneration of the culture.

On the basis of the above considerations, Zamiatnin places Karacharovo later than the well-expressed forms of Final Aurignacian and Early Solutrean of Eastern Europe, and of Kostenki I, Borshevo I, Gagarino, Berdizh and Predmost, but somewhat earlier than the Magdalenian sites of the Voronezh group. Ephimenko [2] considers it early Magdalenian.

14. GONTZI

Location and History.—This site is located at the base of the high right bank of the Udai River, a tributary of the Sula, between the villages of Gontzi and Duhovaya, Lubni district, Poltava region (Fig. 68). It was discovered in 1871 by F. I. Kaminsky, whose attention was attracted by the finds of mammoth bones made by the owner of the land.

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[1] Sawicki, L., "Materials for the Archaeology of Russia," Przeglad Archaeologicznii, Vol. III, Poznan, 1928, p. 110.

[2] Ephimenko, P. P., "Pre-Clan Society," Leningrad, 1936, pp. 346 and 429.

Kaminsky's Excavations.—In 1873, Kaminsky undertook the first investigations, making a trench 2.5 feet deep. During the preliminary investigation he definitely established the presence of a Palaeolithic site characterized by an agglomeration of broken, split, and sometimes charred bones of mammoth, reindeer, and other animals.

In a small area of 36 square feet the remains of six mammoths were found; the bones were in layers and the skeletons incomplete. The long marrow bones were all broken, the upper jaws without tusks or frontal bones. In the same layer were found the shells of *Pupa muscorum*, *Succinea oblonga* and *Helix hispida.*

On one side, slightly higher than this layer of bones, was a deposit 1.5 feet thick, with a large quantity of charred bones of all sizes, small bits of tusks, dental enamel, pieces of flint, and bones of small animals. Most of the stone implements were found in the lower part of this deposit. According to the investigator,[1] 47 flint tools, numerous flakes and hammer-stones were found.[2] He states that all tools were made on flakes and were well preserved, the edges of some being so sharp that a pencil could easily be sharpened by them. Pebbles derived from the nearby boulder clay furnished the raw material. Kaminsky mentions scrapers, knives and other "cutting" tools, one bone awl, and one bone perforator.[3]

Further investigations of Gontzi were made by the geologist K. M. Pheophilaktov,[4] who gives the following cross-section of the site:

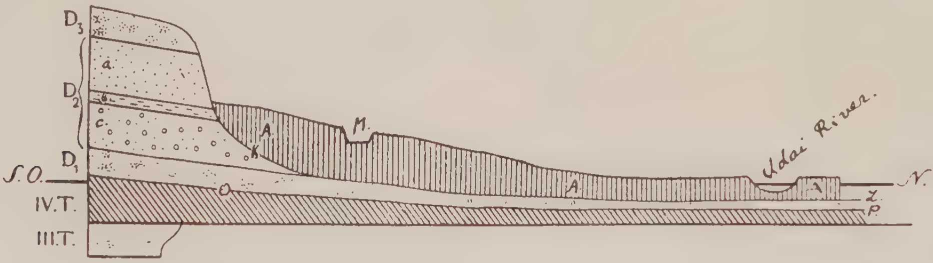

FIG. 66. Cross-section of Udai Valley After Pheophilaktov.

M, cultural finds; D_3, upper pebble layer; D_2, *a*, *b*, *c*, loess; D_1, lower pebble layer; *IV. T.*, multicolored Tertiary clays; *III. T.*, white Tertiary clays; *K–L*, profile of the valley in Quaternary times; *O–P*, profile of the valley in Tertiary times; *A*, alluvium of the river.

He dates the deposit of Gontzi on the basis of his understanding of the geological history of the Ukraine. According to him, there are remains of two principal Ice Age deposits in South Russia. The lower, more ancient, consists of sands, gray loams, with a large admixture of pebbles, and other stone material derived from Silurian, Devonian, and Cretaceous formations, all brought from the north into this region by the glacial waters. This layer contains remains of mammoth.[1]

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[1] Kaminsky, F., "Traces of the Most Ancient Period of the Stone Age along the Sula River and Its Tributaries," Trudi of the III Archeological Congress in Kiev; Kiev, 1878, Vol. I, pp. 147–152. It should be borne in mind that Gontzi was the first Palaeolithic site discovered in Russia, and at the time Kaminsky considered it Mousterian.

[2] See also Uvarov, A. S., "Archeology of Russia, The Stone Age," Moscow, 1881, Vol. II, no. 2591–2595.

[3] Kaminsky, F., "Traces of the Most Ancient Period of the Stone Age along the Sula River and Its Tributaries," Trudi of the III Archeological Congress in Kiev; Kiev, 1878, Vol. I, pp. 147–152. See table VII, Fig. 1–47.

[4] Pheophilaktov, K. M., "The Location of the Finds of the Stone Flint Tools with the Bones of Mammoth in the Village Gontzi, on the Udai River," Trudi of the III Archeological Congress in Kiev; Kiev, 1878, Vol. I, pp. 153–159.

The upper layer (the second for Poltava, and the last one for the Kiev region, which is situated further south) consists of loess, which attains in places a thickness of 21 meters. Both layers (the sands or loams with pebbles, and the loess) are found in the same position in the Poltava region as in Kiev, with this difference, however: that along the Udai and Sula Rivers there is also a third layer composed partly of loose quartzitic sands, and partly of yellow loam and sandy clay very similar to the loess in color and composition.

Thus, according to Pheophilaktov, in the Kiev region, the formation of the loess concluded the Ice Age, while in Poltava, which lies further north, this layer of loess was covered by the new advance of the ice (Würm?). The terminal moraine, consisting of gravel, boulders of crystalline, and other formations, formed the third layer. This layer is somewhat mixed with the underlying layer of loess, much in the same way, as the lower pebble (Riss moraine) layer was mixed with the underlying Tertiary formations.

In conclusion Pheophilaktov states that layer *A* (Fig. 66), in which the cultural finds were made, is a river-deposited formation, yellow in color, lithographically identical with loess, which in the Poltava region, lies above the Würmian glacial deposits, and consequently is of postglacial times.

Excavations by Scherbakovsky and Gorodzov.—After the investigations of Kaminsky and Pheophilaktov, Gontzi was forgotten until V. Scherbakovsky, the curator of the Poltava State Museum, made the first really scientific investigation of this site in 1914–1915. In 1915 Prof. Vernadsky, geologist, and V. A. Gorodzov, archaeologist, participated in larger excavations, the results of which, unfortunately, are as yet very inadequately published[2] (Fig. 69). The following summary is made mainly on the basis of the work of Scherbakovsky and Gorodzov, with the differences between the two pointed out when necessary.

Geology.—The investigators excavated an area of 60 square meters and made a number of trenches for the geological profiles, which reveal the following stratigraphy (Fig. 67):

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[1] Perhaps a Riss moraine. (E. G.)

[2] (*a*) Scherbakovsky, V., "The Excavations of the Paleolithic Settlement in the Village Gontzi, Luben County, Poltava Region in 1914–1915," Zapiski of the Ukrainian Society for the Study and Preservation of Antiquities in Poltava region, Poltava, 1919, pp. 62–75. (Poor illustrations.)

(*b*) Burkitt, M. C., "Archaeological Work in Ukraine by Prof. Scherbakovsky," The Antiquaries Journal, July, 1925, Vol. V, no. 3, pp. 273–277.

(*c*) Gorodzov, V. A., "Archaeology, The Stone Age," Moscow, 1925, Vol. 1, pp. 285–290.

(*d*) Gorodzov, V. A., "The Investigations of the Palaeolithic Site of Gontzi in 1915"; RANION, Moscow, 1926, Vol. I, pp. 5–35. (Geology, industry, and very inadequate illustrations.)

(*e*) Breuil, H., Review of "Les fouilles de la station paléolitique (Magdalenien) dans le village de Hontzi, district de Loubne, gouv. Poltava (Ukraine) en 1914 et 1915;" "L'Anthropologie," Vol. XXXIV, p. 427.

(*f*) Rudinsky, M., "The Archaeological Collection of the State Poltava Museum," Poltava, 1928, pp. 7–8, reproduces twelve specimens of flint industry.

(*g*) Sawicki, L., "Materials for the Study of Archaeology of Russia," Przeglad Archeologicznii, Poznan, 1926–1928, Vol. III, pp. 2–3. (Gives the best illustrations.)

(*h*) Ephimenko, P. P., "Pre-Clan Society," Leningrad, 1936, pp. 440–443. (Reproduces several stone and bone implements.)

At the base of the slope of the Udai valley is a layer (*IV*) of multi-colored clays (*IV. T.* of Pheophilaktov and *D* of Gorodzov), over which lies a stratum (*III*) of gray sands (*C* of Gorodzov, absent in Pheophilaktov). This is covered in turn by a layer (*II*) of boulder clay, moraine of the Würm glaciation (*B* of Gorodzov, *D* of Pheophilaktov). Over this moraine clay there lies a layer (*I*) of yellow loess, or a sort of loess-like clay or loam (*A* of Gorodzov, *A* of Pheophilaktov), which, sloping downwards, covers the ancient terrace of the Udai River.

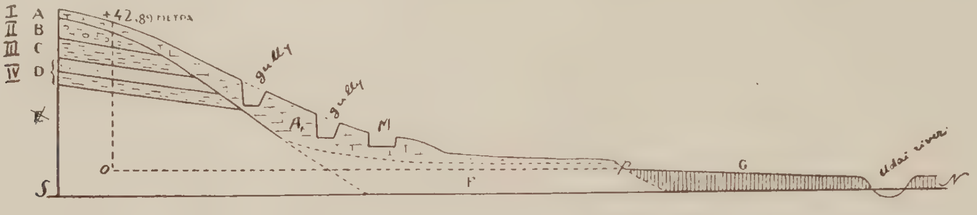

FIG. 67. Cross-section of Gontzi Site. After V. Gorodzov.

G, alluvium of Udai River; A_1, diluvial deposits; *F*, diluvial terrace; *A*, humus; *B*, pebble clay; *C*, Tertiary quartzite sands; *D*, multicolored clays; *E*, marl; roman figures, those of the author.

Pheophilaktov indicated (Fig. 66) the presence of still another layer of the boulder clay (*D2*) which, according to both later investigators, was nowhere observed.

The structure of the terrace itself, according to Scherbakovsky, is as follows:

I. Loess-like loam with a large admixture of humus, 60 cm. thick.
II. Loess, 2.20 meters thick, in the lower part of which was the cultural deposit, 60 cm. thick.
III. Sandy-clayish, schistous river deposit, the ancient alluvial of Udai, reaching a thickness of ten meters.
IV. Marl, which forms the floor of the valley.

Gorodzov thinks that both II and III are of diluvial origin, and Pheophilaktov attributes the formation of both to alluvial processes.[1] Barring these differences, it is evident that the cultural deposits were found in a layer which was formed during the last retreat of the Würm glaciation, which fact seems to be substantiated also by the fauna.

Fauna.—According to Gorodzov, supplemented by the list given by Gromov,[2] bones of the following animals were found:

1. *Elephas primigenius*, very numerous.
2. *Elephas primigenius minor.*
3. *Bos* sp.
4. *Cervus* sp.
5. *Alces alces.*
6. *Rangifer tarandus.*
7. *Canis lupus.*
8. *Ursus arctos.*[3]
9. *Lepus timidus.*
10. *Lepus variabilis.*
11. *Sus scrofa ferus.*

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[1] According to Gorodzov, this site existed during the strong diluvial activities of the last glaciation. At that time the high bank covered by the loess of the Third glaciation was washed by strong precipitations, and, becoming the object of the action of alluvial processes, moved down on the gentle slope of the Udai river valley. (Gorodzov, V. A., "The Investigations of the Palaeolithic Site of Gontzi in 1915," RANION, Moscow, 1926, Vol. I, pp. 5–35.)

[2] Gromov, V. I., "Geology and Fauna of the Palaeolithic Period in U.S.S.R.," Problems of the History of Material Culture, No. 1–2, Leningrad, 1933, pp. 28–29.

[3] According to Ephimenko, P. P. ("Pre-Clan Society," Leningrad, 1936, p. 441), *Ursus spelea.*

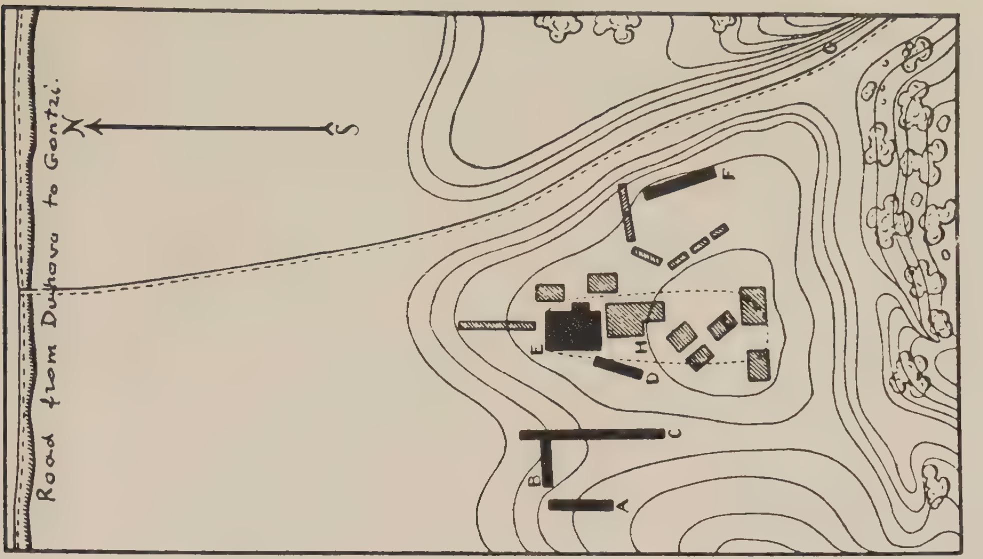
Road from Duhovo to Gontzi
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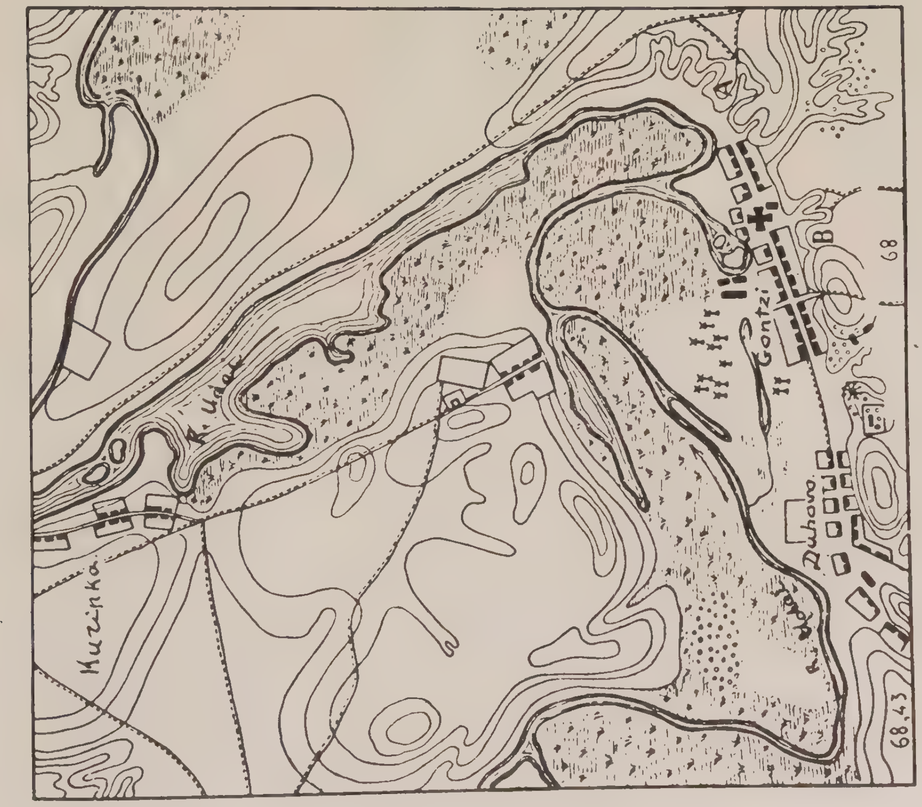
Fig. 69. The Site of Gontzi. Solid portion indicates excavations of 1915 of Gorodzov; shaded portion indicates excavations of previous years. After V. A. Gorodzov.


Kuzinka
R. Udai
Gontzi
Duhovo
R. Udai
B
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68,43

Fig. 68. General Map of Gontzi Site and the Valley of the Udai River. After V. A. Gorodzov.

Cultural Remains.—The excavation of Scherbakovsky resulted in the discovery of five groups of animal bones, varying in size from 25 sq. m. for the largest, to 7 sq. m. for the second group. The rest were about 1 sq. m. each (Fig. 70).

As is usually the case in several other Upper Palaeolithic sites of European Russia, the cultural finds were almost totally absent in the areas between these bone accumulations.

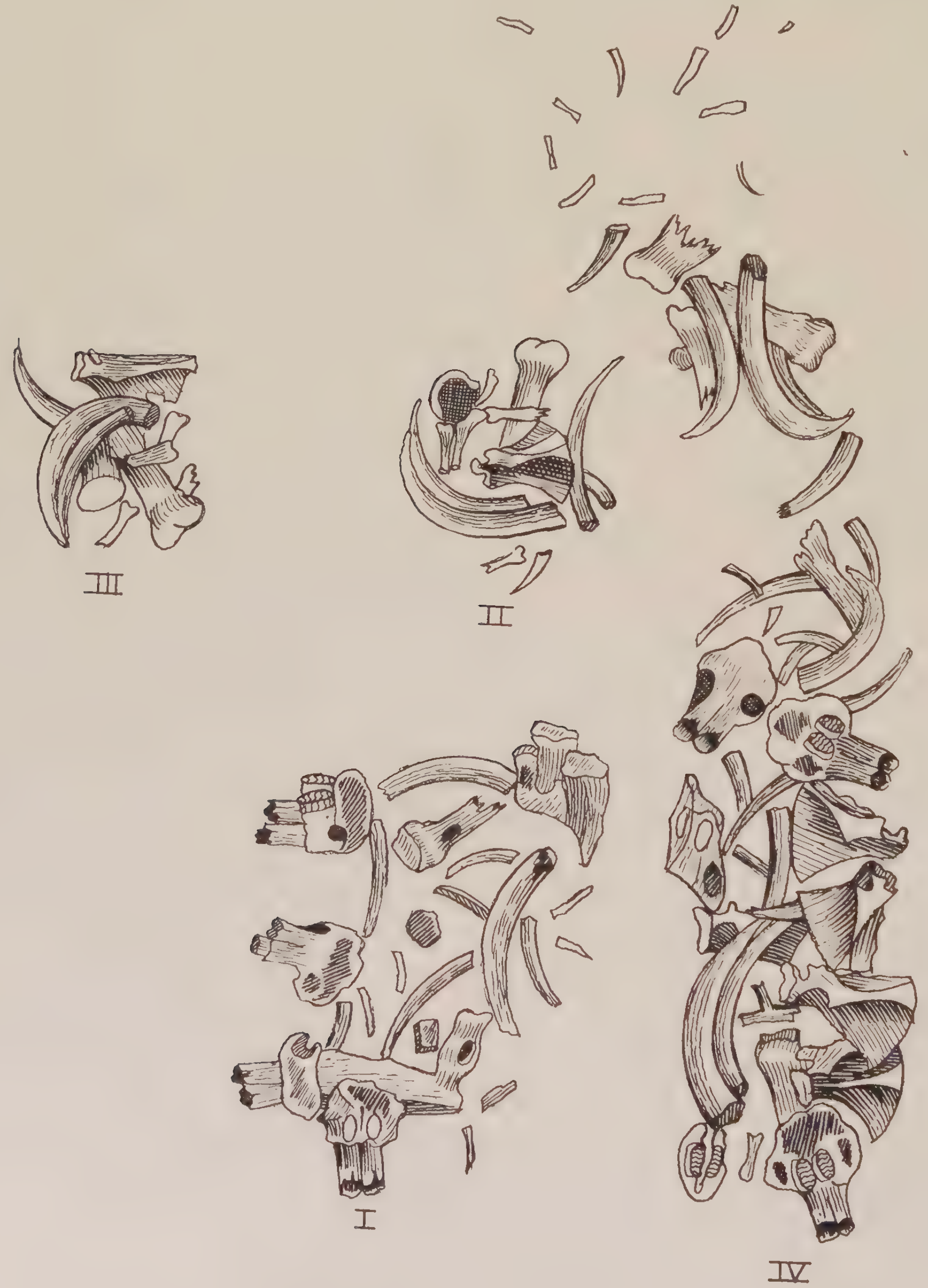

Fig. 70. The Bone Piles of Gontzi. After V. A. Gorodzov.

The middle portion of each pile consisted of small bone splinters, charred bone, and what the excavator calls "sweepings." This material was covered around the periphery by larger bones such as skulls, hip-bones, shoulder blades, and tusks of mammoth.

The actual significance of these bone-heaps is not clear. Gorodzov sees in them sweepings from dwellings, regular kitchen middens.[1] Scherbakovsky suggests that the large bones, covering the piles of small bone splinters, could have served to protect the contents of the pile from the wind(?).[2] Ephimenko interprets these piles quite ingeniously in accordance with his firm belief in the existence of Upper Palaeolithic dwellings. In his opinion,[3] the kitchen-middens in the center of the piles represent the floor of the dwelling where all sorts of rubbish easily accumulate. The larger bones were originally placed on the roof of the dwelling, possibly as a ready supply of raw material for the making of bone tools;[4] later, with the sagging of the abandoned or burned hut, these large bones slid down from the roof, forming the peripheral zone. This hypothesis does not, however, explain the similar conditions encountered in the piles of only one square meter in area (too small for a hut) and the too regular character of the "protecting" position of the larger bones. In this connection the observation of Gorodzov is quite interesting. According to him,[5] in pile no. 1 (Fig. 70) several tusks were found, lying alongside the slope of the pile, with the end of their curves turned down. He rightly remarks, that this testifies to intentional placing of tusks in this position on the soft pile of sweepings. Had they been just thrown down, or had they fallen or slid down, as suggested by Ephimenko, the law of gravity would have caused the ends to turn upwards.

Scherbakovsky describes further the remains of a hearth, characterized by the layer of very small charred bones, 2 cm. thick. He definitely states that nowhere on this site has he found any charcoal, though according to Gorodzov,[6] the bone piles were usually accompanied by a few pieces of charred wood. Both investigators agree however that Gontzi Man may have used bone instead of wood as the fire material.

The investigations seemed to show that the animals were killed elsewhere and brought to the site, as there was found only one lower jaw of mammoth to 27 upper ones, many shoulder blades, but few long bones, only a couple of vertebrae, and very few ribs. Mammoth seems to have been the main game for the inhabitants of Gontzi. It was estimated that there were bones of at least forty mammoth, the second largest number after the Cyrill Street site. The majority of bones belong to young individuals. After mammoth, reindeer and hare bones are the most numerous.

[1] Gorodzov, V. A., "The Investigations of the Palaeolithic Site of Gontzi in 1915," RANION, Moscow, Vol. I, 1926, pp. 5–35.

[2] Scherbakovsky, V., "The Excavations of the Palaeolithic Settlement in the Village Gontzi, Luben County, Poltava Region in 1914–1915," Zapiski of the Ukrainian Society for the Study and Preservation of Antiquities in Poltava region, Poltava, 1919, p. 68.

[3] Ephimenko, P. P., "Pre-Clan Society," Leningrad, 1936, p. 441.

[4] Or as the fire supply, which would also explain the large number of shoulder blades, not as good for bone work. It should be pointed out, that in spite of the abundance of tusks, very few objects were made out of ivory. (E. G.)

[5] Gorodzov, V. A., "The Investigations of the Palaeolithic Site of Gontzi in 1915," RANION, Moscow, 1926, Vol. I, p. 21.

[6] Gorodzov, V. A., "The Investigations of the Palaeolithic Site of Gontzi in 1915," RANION, Moscow, 1926, Vol. I, p. 20.

Stone Industry.

Dark gray or yellow flint of chalk origin furnished the principal material for the stone industry. Perhaps it is due to the limitation of material (small pebbles from the boulder clay) that the size of the finished tools, blades, and nuclei, is comparatively small. The majority of blades is only 4–5 cm. long.

The illustrative material of the stone industry is very limited, and because of the importance of the site, it was thought advisable to reproduce all that is available to the writer, in spite of occasional duplication and inadequacy of representation.

The following types of tools were found in Gontzi:

Nuclei.—Gorodzov reproduces two nuclei (Fig. 71, nos. 1, 2) of conical form.

Blades.—Blades are not numerous in the material illustrated. Usually they have a well retouched or blunted back (Fig. 71, nos. 3–4; Fig. 73, nos. 12–14; Fig. 74, nos. 1–3). Some are of the type of *lame de canif* (Fig. 71, nos. 5–7), and some are very small (Fig. 71, nos. 9–15).

Scrapers.—Scrapers form the largest group. In the excavations of Scherbakovsky, out of some 200 tools, there are 95 scrapers. They are usually very small and are often made from a broken blade. There are small round *grattoirs*, very high, with semicircular retouch (Fig. 71, no. 17; Fig. 73, nos. 17, 18). One example has almost a straight edge. The single and double *grattoirs* are made on both ends of a broken blade (Fig. 73, no. 15; Fig. 74, nos. 18–20) often in combination with burins (Fig. 71, nos. 20, 21).

Burins.—Burins are also numerous (75). There are many examples of *burin d'angle* (Fig. 74, nos. 10–12) and *burin bec de flûte* (Fig. 71, nos. 22–28; Fig. 74, nos. 13, 17). There are also double forms such as *bec de perroquet-grattoir* (Fig. 74, nos. 7, 8), and examples of *bec de peroquet atypique* (Fig. 71, nos. 29, 30; Fig. 74, no. 11).

Perforators.—Perforators are rare (four in Scherbakovsky's excavations) made on narrow blades, finely retouched on both sides to form a point (Fig. 73, no. 16; Fig. 74, nos. 21–22). Gorodzov also mentions flat stones with traces of use, which he thinks were used for sharpening the bone needles and awls. Scherbakovsky speaks of a dozen round pebbles found in one place.[1]

Bone Industry.

Awls (Fig. 71, nos. 32–41; Fig. 72, nos. 1, 2).—Awls are made usually out of the long bones of a hare, split and sharply pointed on one end. To the same category may belong the fragments of larger ivory points, though Ephimenko calls them dart points.

Needles.—Needles are much less numerous, there being only two whole ones, very beautifully made, and perforated at one end (Fig. 72, no. 1).

Hammer.—A peculiar object, with a round hole in the middle, is called a hammer by Gorodzov. Scherbakovsky sees in it a sort of hair ornament, while Ephimenko considers it a miniature dart-shaft straightener or an implement for the softening of strips of hide (Fig. 72, no. 3). According to Scherbakovsky, a piece of reindeer horn, an unfinished *baton de commandement*, was found. (No illustration is given.)

Decorated Objects.

Contrasted with the splendid examples from Mezine, Gontzi yielded very little in the way of art, with the exception of one awl of mammoth ivory with traces of lineal ornament (Fig. 72, no. 4) and a tip of mammoth tusk with several engraved lines crossed

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[1] Sling-stones ? . E. G.

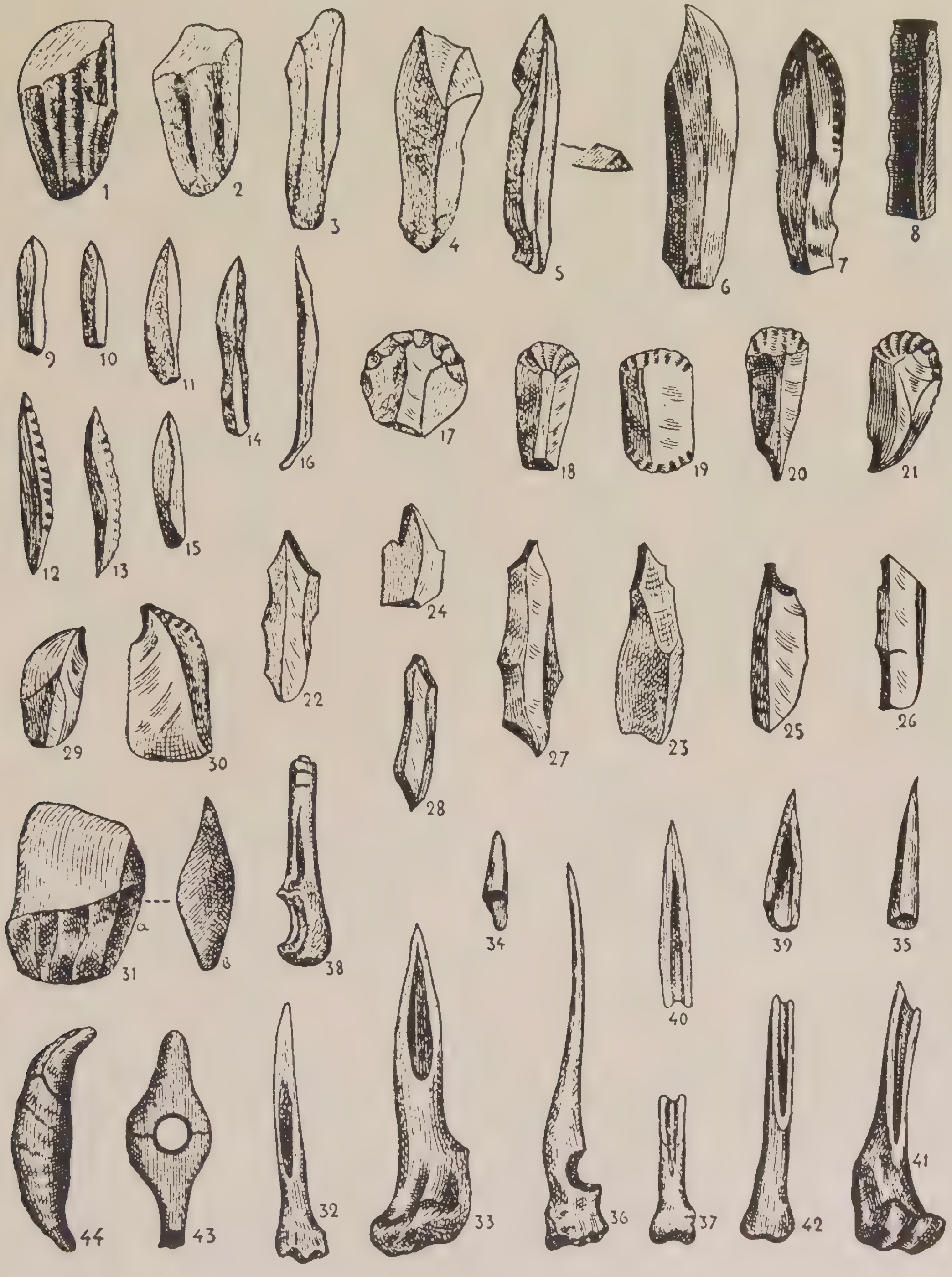
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Fig. 71. Stone and Bone Industry of Gontzi. After V. A. Gorodzov.

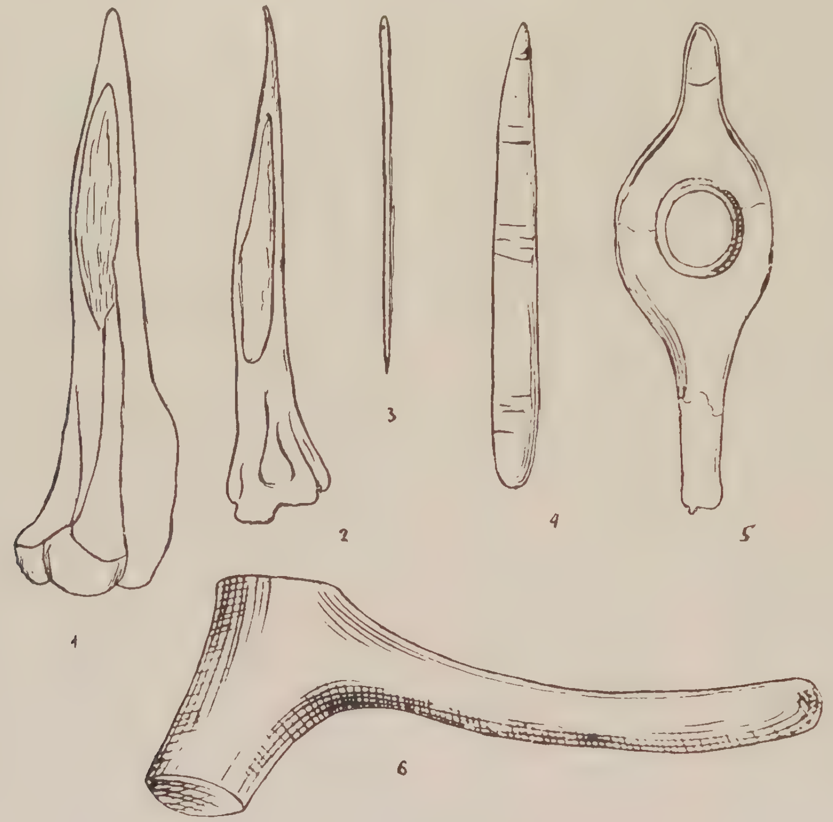

Fig. 72. Bone Industry of Gontzi. After V. Scherbakovsky.

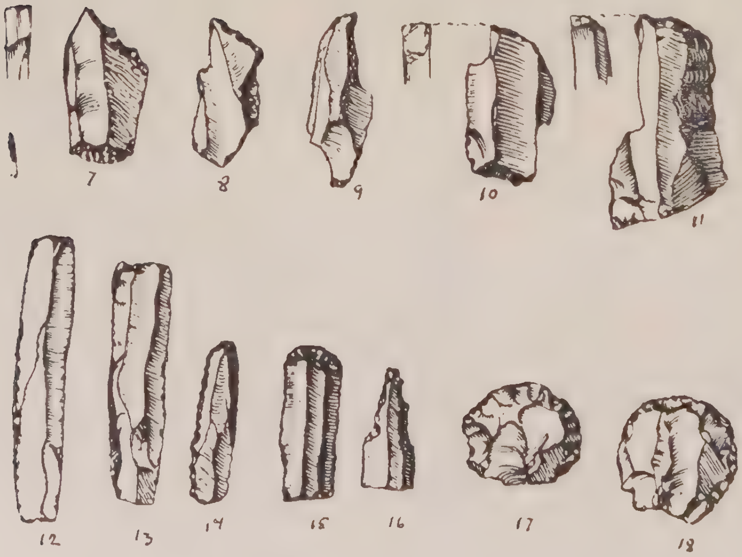
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Fig. 73. Stone Industry of Gontzi. After M. Rudinsky.

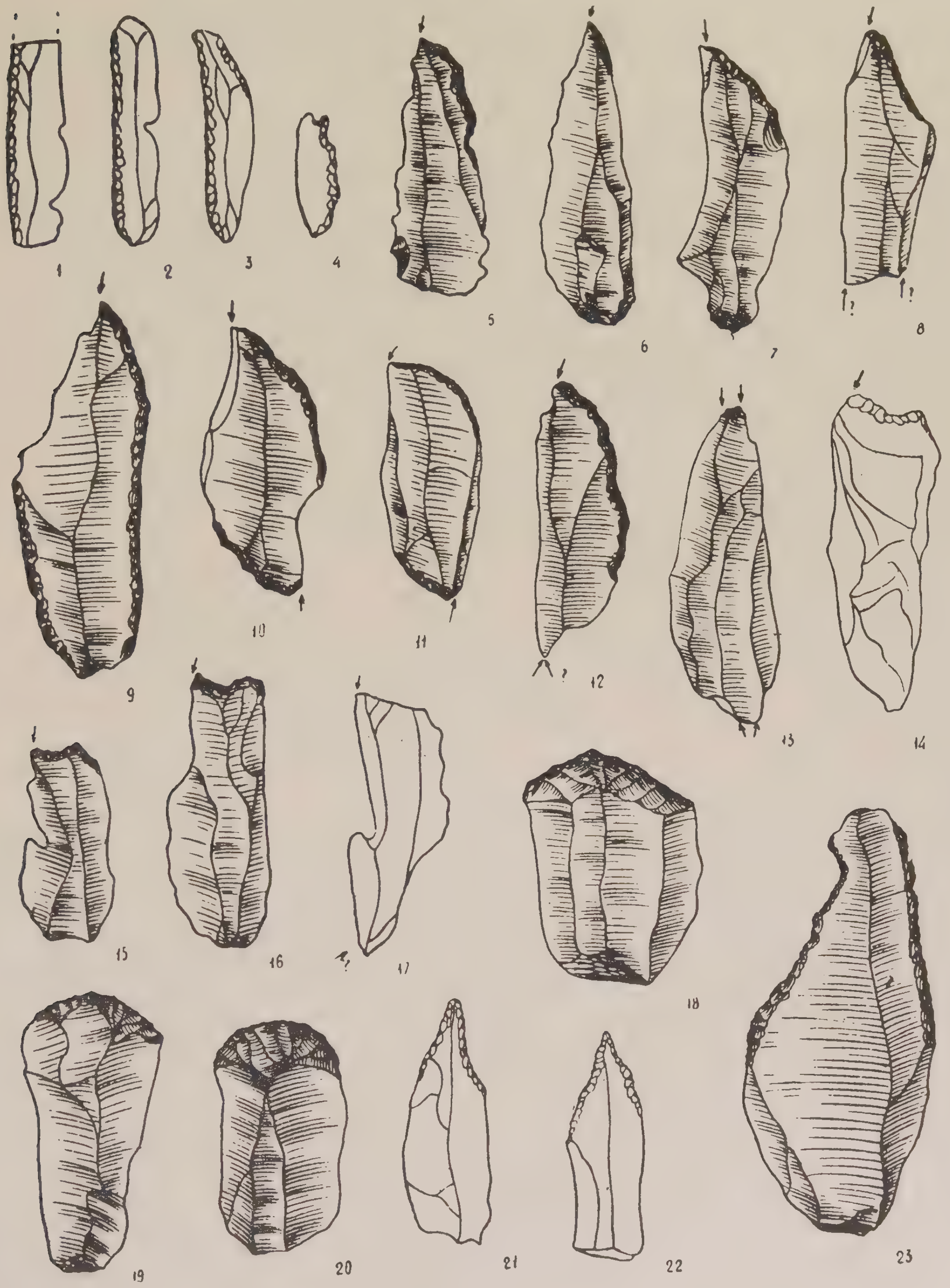
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FIG. 74. Stone Industry of Gontzi. After L. Sawicki.

at right angles and at regular intervals by smaller lines of various length (Fig. 75). The latter may be an attempt at ornamentation or, what is more likely, some sort of hunting record.[1]

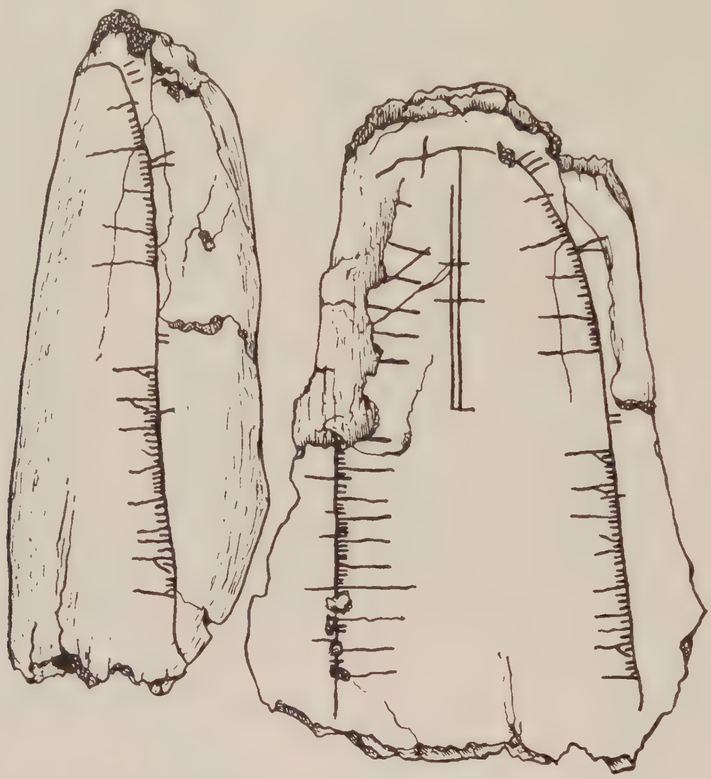

FIG. 75. Tip of Mammoth Tusk with Lineal Engravings from Gontzi.. After V. Scherbakovsky.

Dating.—On the basis of the general character of the stone and bone industries of Gontzi, most of the investigators date this site as Magdalenian.

According to Gorodzov, Gontzi is somewhat later than Mezine, and considerably later than the site of Cyrill Street.

Scherbakovsky likewise dates it as Magdalenian, and points out the general similarity to Mezine, with one notable exception: horse remains, so abundant in Mezine, are absent in the kitchen refuse of Gontzi.

On the basis of the presence of miniature forms, such as small round scrapers, *lame de canif*, and *bec de perroquet*, Ephimenko places Gontzi in the very last phase of Magdalenian; almost the transition to the Azilian.

M. C. Burkitt [2] quite wisely suggests the term of "Eastern European Upper Palaeolithic" which, according to him, occurs in an area "where the Magdalenians, a French folk, never penetrated, although their influence was no doubt felt." Menghin [3] thinks that the industry of Gontzi is related to Kostenki I, but is younger. The geometrical forms show, according to him, the Tardenosian influence.

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[1] Burkitt, M. C., "Archaeological Work in Ukraine by Prof. Scherbakovsky," The Antiquaries Journal, July, 1925, Vol. V, No. 3, Fig. 2.

[2] Burkitt, M. C., "Archaeological Work in Ukraine by Prof. Scherbakovsky," The Antiquaries Journal, July, 1925, Vol. V, No. 3, p. 273.

[3] Menghin, Otto, "Die Weltgeschichte des Steinzeit," p. 174.

15. BORSHEVO II

Location.—Borshevo II is located between the villages of Kostenki and Borshevo, at the point where the shore of the Don River approaches the mountains of the right side of the valley, leaving just enough space for the narrow terrace of the steep bank. The chalky bank is furrowed here by numerous gullies. At the wide mouth of one of them lies the site of Borshevo I. A short distance further down the river the shore is even wider, forming a more or less even plateau, only 4–5 meters over the river level. The site of Borshevo II, located here, is periodically covered by spring waters.

History.—Borshevo II was discovered, in 1923, by P. P. Ephimenko, who found a cultural layer running for 100 meters along the bank of the Don between two gullies.

Geology.—According to the excavator,[1] the geological structure of the terrace is as follows:

I. Humus.
II. Yellow loam with many incrustations of chalk, about 1 meter thick, composed apparently of diluvial water deposit and the material washed out of the high shore.
III. A dark layer of ancient humus 5–10 cm. thick, containing the upper cultural horizon.
IV. A compact clayish loam containing a very large quantity of small fresh-water mollusks; it is an alluvial deposit, reaching the river level. This layer contains the middle and lower cultural horizons.
V. Gray tertiary clay.

Fauna.—After Gromov:[2]

	Lower and Middle Horizons.	*Upper Horizon.*
Elephas primigenius	X	absent
Sus scrofa ferus	X	X
Equus (equus)	numerous	very numerous
Bos sp.	traces	absent
Ovibos moschatus	X	X
Alces alces	X	absent
Rangifer tarandus	X	X
Canis (canis) (sp.)	X	X
Vulpes sp.	X	absent
Gulo gulo	X	X
Felis leo	X	X
Marmota	X	X
Lepus sp.	very numerous	X

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[1] Ephimenko, P. P., "Pre-Clan Society," Leningrad, 1936, pp. 443–446. A full account of this site is as yet unpublished by Ephimenko.

Sawicki, L. ("Materials for the Study of Russian Archaeology," Przeglad Archeologicznii, Poznan, 1926–28, Vol. III, pp. 2, 3), however, gives quite a bit of information and the series of good plates which are reproduced here.

[2] Gromov, V. I., "Geology and Fauna of the Palaeolithic Period in U.S.S.R.," Problems of the History of Material Culture, Leningrad, 1933, pp. 1–2.

The fauna in these three separate horizons has a more or less similar arctic character; *Gulo gulo,*[1] *Rangifer tarandus* and *Equus* sp. are the most common and are found in large quantities. In the lower horizon, situated in the ancient river deposits, mammoth are quite numerous, diminishing in quantity in the middle horizon, and completely disappearing in the upper.

The lower horizon abounds in remains of hare; among which was found a leg of this animal which, judging by the position of the bones, had evidently been cut off intact. This custom is quite prevalent among modern Siberian hunters.

The upper cultural horizon was found in the third layer, and consists of the remains of a hearth, characterized by nests of charcoal, charred bones, numerous flint chips, and lumps of red and yellow ochre. No cultural finds higher than the limits of the "ancient humus" were made.

Slightly further up the river the cultural finds in level III cease, but in layer IV was encountered the middle horizon situated about 25–30 cm. below layer III. No remains of the hearths were found here; bones and flints were scattered. Below the middle horizon lies the lower horizon which consists of a thin intermittent streak of charcoal. Ephimenko feels that both the lower and middle horizons are the remnants of a large site destroyed here by fluvial action.

Flint Industry.[2]

The majority of stone implements of Borshevo II were made of dark flint derived from chalk. Only 25 per cent. were made of pebble flint of different colors.

During the excavations, the following types of implements were found:

Lower Horizon.	Figs. 79–80, nos. 1–14.
Nuclei	No. 14
Grattoir on broken blade	Nos. 6, 7
Double *grattoir* on broken blade	No. 8
Grattoirs on flake	Nos. 9, 10, 11, 12
Burin d'angle	Nos. 1, 2
Burin bec de flûte and *grattoir*	Nos. 3, 4, 5
Burin medial	No. 13

Ephimenko points out the presence of nucleiform tools (*rabot*) and the general massiveness of *burins.*

Middle Horizon.	Figs. 78–79, nos. 1–33.
Blades with partial retouch	Nos. 1–4
Backed blades	Nos. 5, 6, 7
Points (?)	Nos. 8, 9
Burin d'angle	Nos. 10–19, 25
Double multifacetted *burins*	Nos. 20–24, 28
Burin bec de flûte	No. 26
Burin bec de flûte and *burin d'angle*	No. 27
Burin bec de flûte and polyhedric	No. 29
Burin d'angle and *grattoir*	No. 30
Grattoir on retouched blade	Nos. 31, 32
Grattoir	No. 33

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[1] Ephimenko, P. P. ("Some Results of the Study of Palaeolithic Period in U.S.S.R.," "Chelovek," No. 1, 1928, Leningrad, p. 56), mentions instead *Gulo borealis.*

[2] The stone industry of Borshevo II is well published by L. Sawicki, whose plates are reproduced here (E. G.)

This industry in general is quite similar to that of the lower horizon, with the exception of the predominance of double tools. The flint in this level is vari-colored. Ephimenko is inclined to believe that the color of the material meant more than its quality to the inhabitants of Borshevo II.[1]

Upper Horizon.	Figs. 76–77, nos. 1–37.
Nuclei	Nos. 36, 37
Nuclei of discoidal type	No. 34
Rabot or tool of nucleiform type	No. 35
Points of *La Gravette* type	Nos. 1–3
Points of *La Gravette* type-broken	Nos. 4, 7
Lame de canif atypique with partial side retouch	Nos. 5, 6
Burin d'angle	Nos. 8–12
Nucleiform *burin*	No. 13
Burin bec de flûte	Nos. 14–15
Burin lateral-d'angle (?)	No. 16
Burin bec de flûte-grattoir	Nos. 17, 19
Burin d'angle on broken blade and *grattoir*	No. 18
Grattoir	Nos. 20–24
Grattoir sur bout de lame courte	Nos. 25, 26
Grattoir on thin wide flake and blade	Nos. 27–32
Double high *grattoir*	No. 33

The tools of this horizon are made exclusively from dark flint of chalk origin. The cultural finds are concentrated in areas, 3–5 meters in diameter, consisting of ashes, charcoal, charred and split bones, flint chips, and pieces of ochre. In one of these "hearths" of this horizon was found a half-shell of a fresh-water mollusk filled with bright red ochre, which, according to Ephimenko,[2] was previously powdered and mixed with some other matter.

On the excavated area of 250 square meters Ephimenko found ten such "hearths" which he considers the remains of huts. It is interesting to note, that here, as in Gontzi (see page 367), no cultural remains were found in the area between these "hearths," which, themselves, were not very rich in finds, averaging several dozen implements in each.

The characteristic feature of the stone industry of this horizon, according to Ephimenko is the larger size of the tools (7–9 cm.) and their regularity of form.

Bone Industry.

Lower Horizon.—According to Ephimenko [3] the following implements were found: [4]

1. Awls made of split, tubular hare bones, similar to those of Gontzi.
2. Bone points.
3. A bone needle perforated at the end.
4. A plaque of mammoth tusk showing the process of needle making.

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[1] The utmost utilization of good blades and a large quantity of double tools point out to the general scarcity of good raw material, necessitating the use of pebble flint which just happened to be vari-colored. (E. G.)

[2] Ephimenko, P. P., "Pre-Clan Society," Leningrad, 1936, p. 251.

[3] Ephimenko, P. P., "Pre-Clan Society," Leningrad, 1936.

[4] There are no illustrations available. (E. G.)

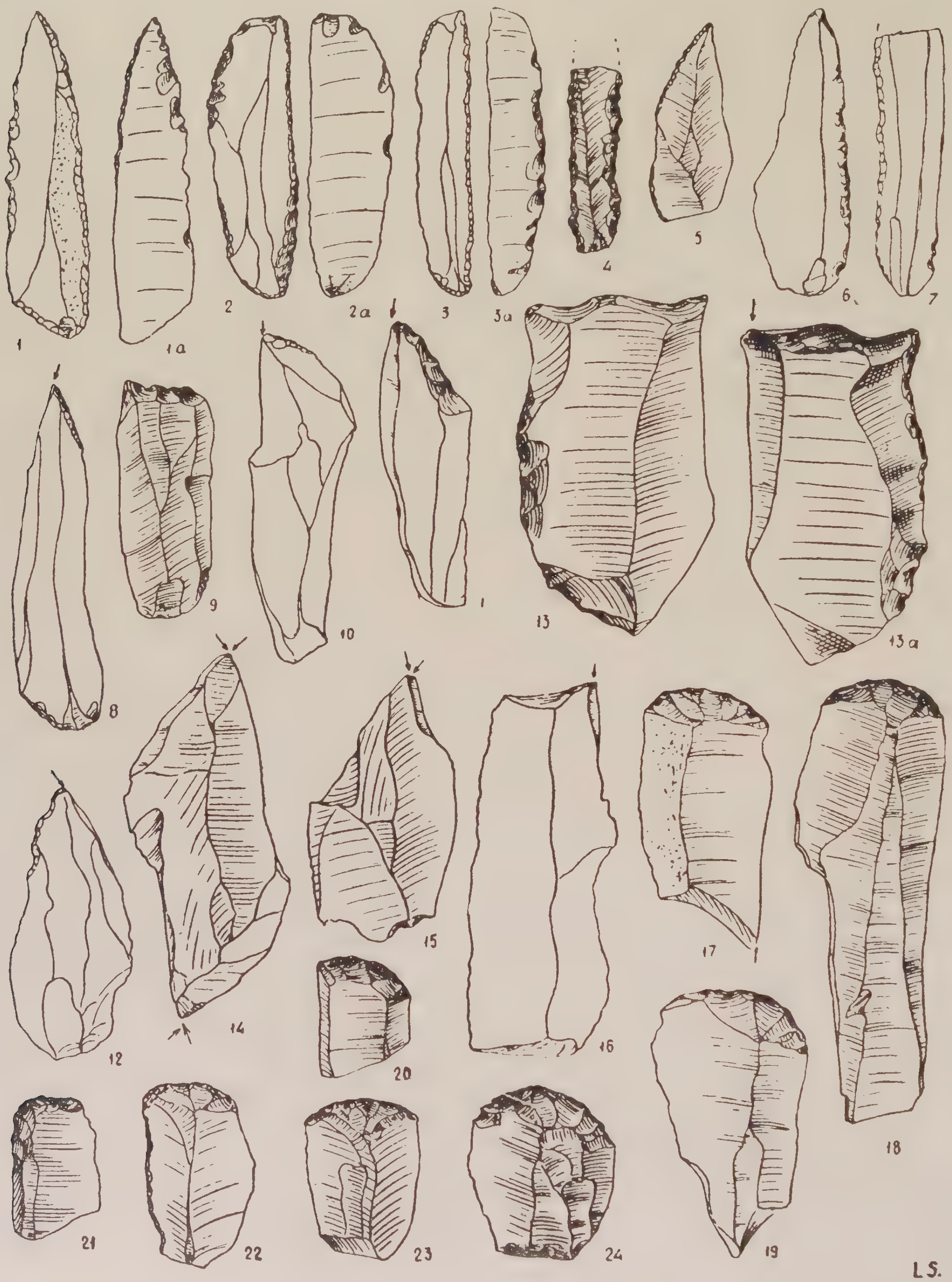
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FIG. 76. Stone Industry of Borshevo II, Upper Layer. After L. Sawicki.

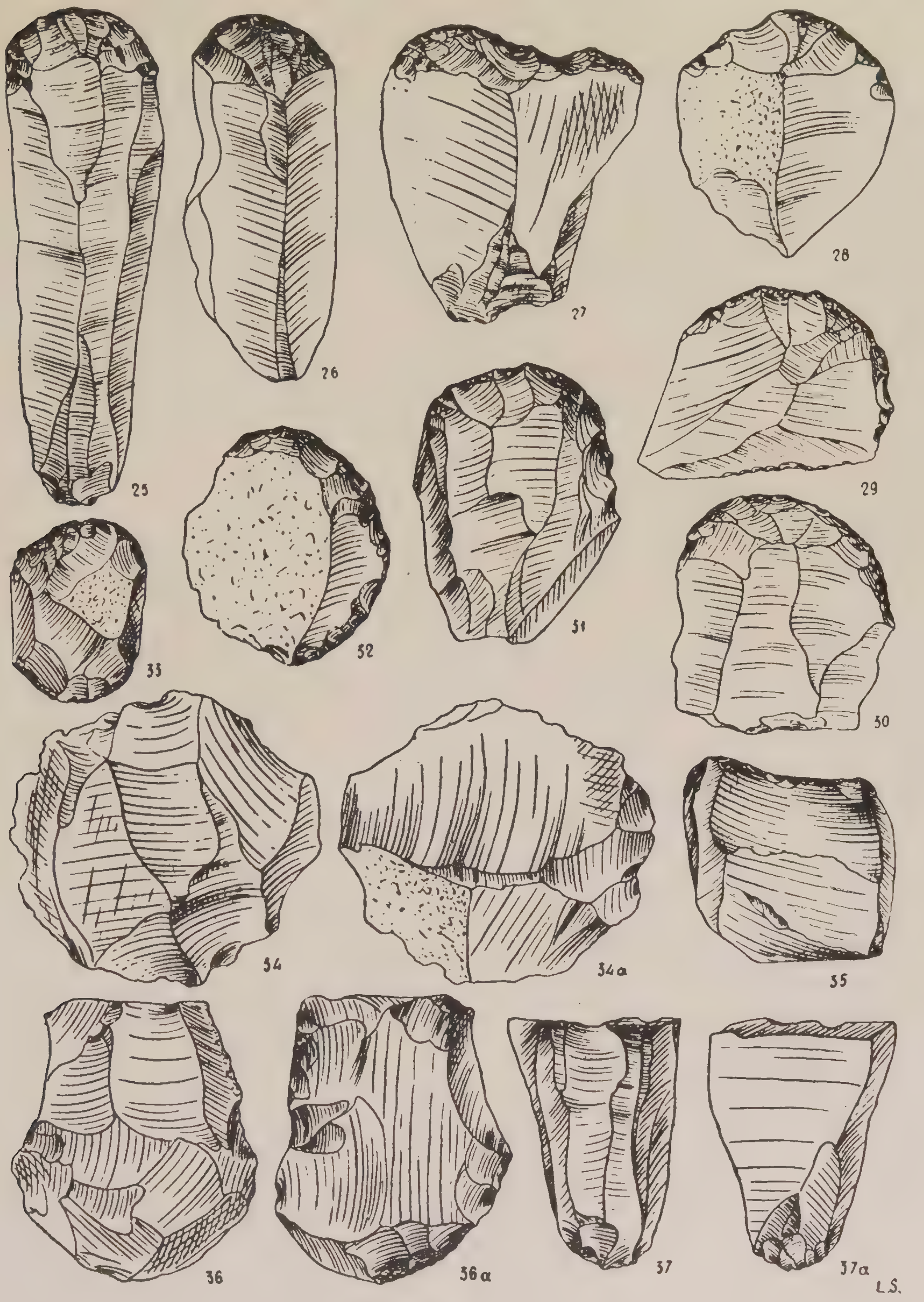
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FIG. 77. Stone Industry of Borshevo II, Upper Layer. After L. Sawicki.

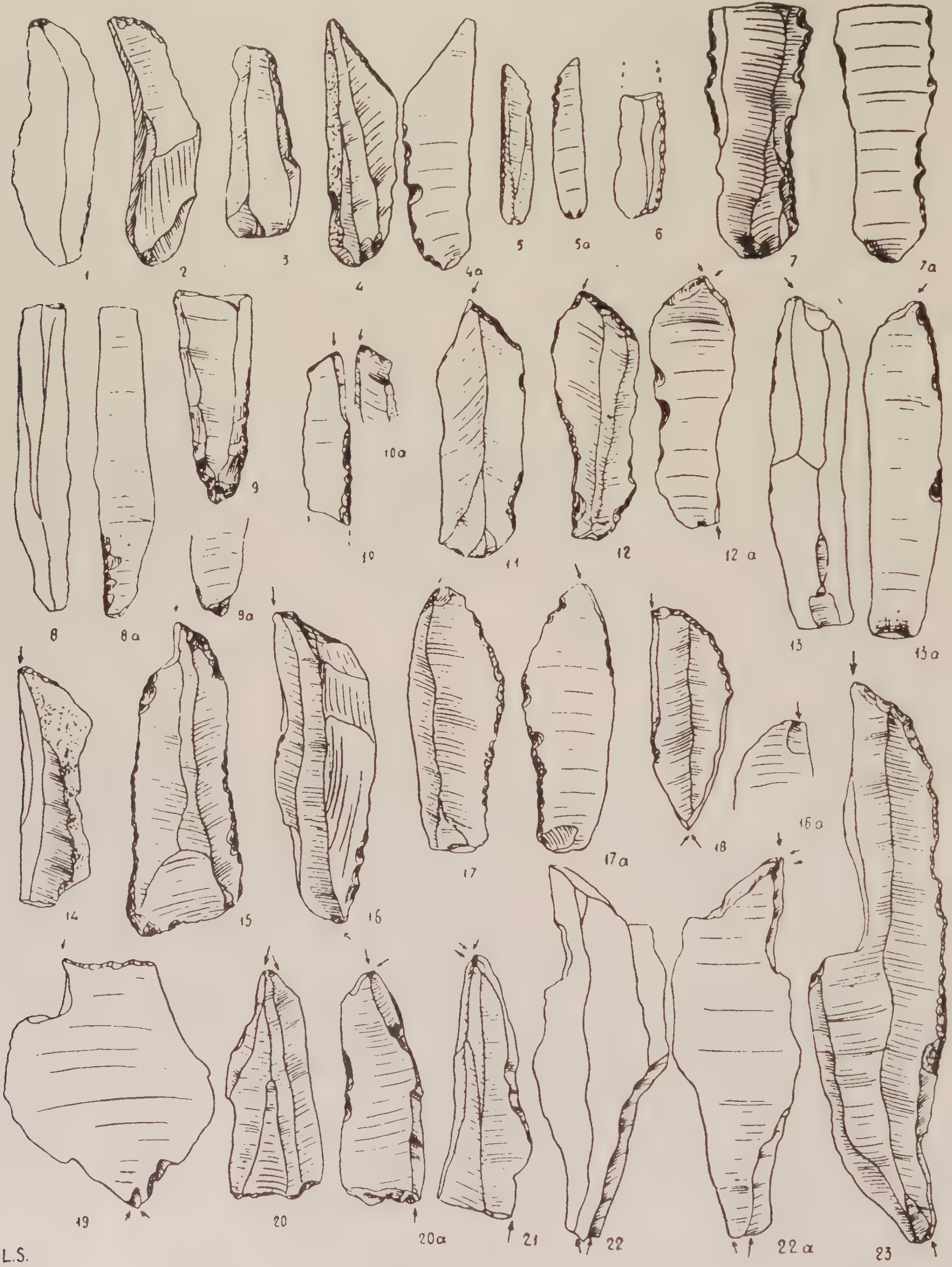
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FIG. 78. Stone Industry of Borshevo II, Middle Layer. After L. Sawicki.

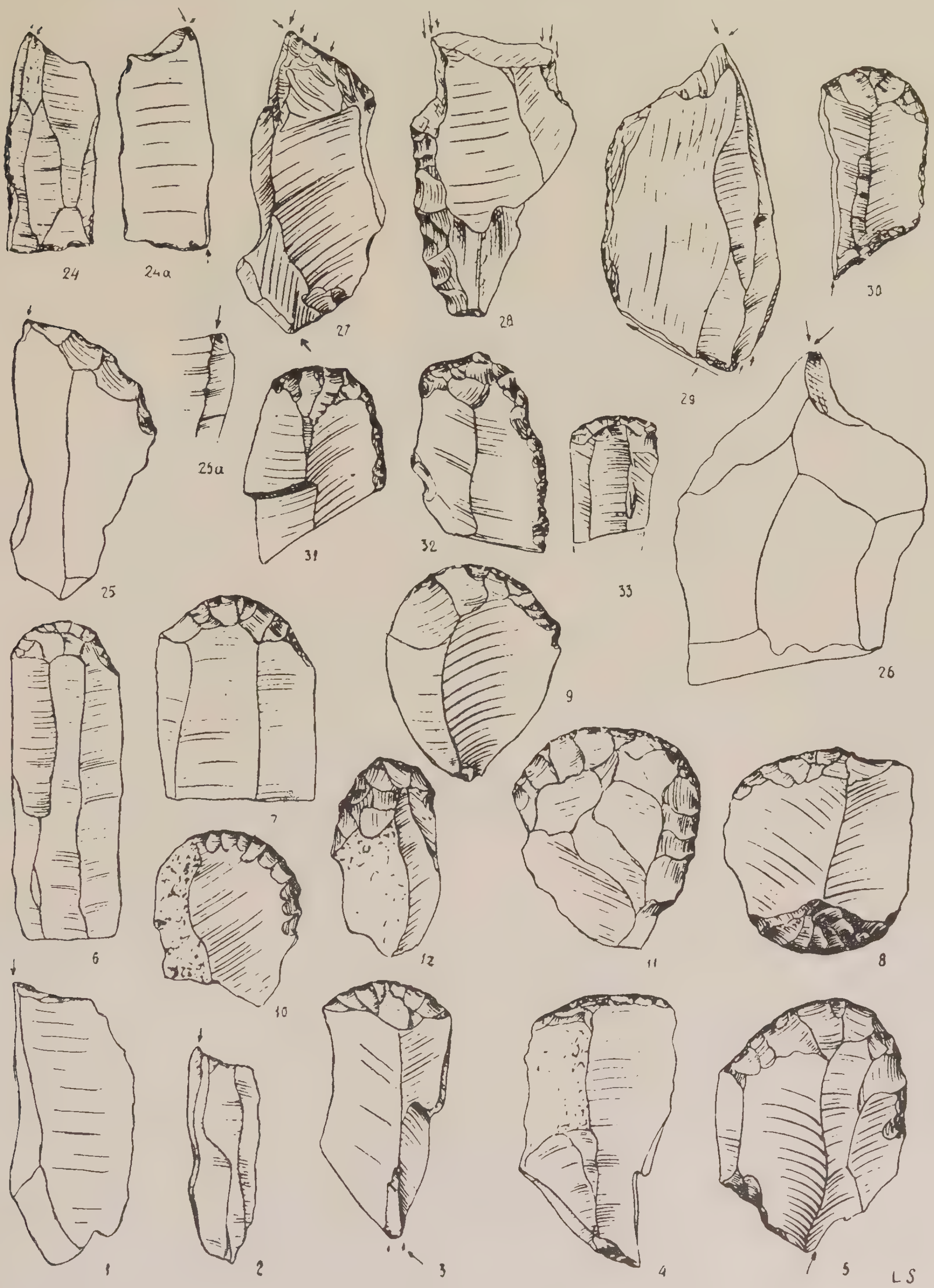
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FIG. 79. Stone Industry of Borshevo II, Middle (24–33) and Lower (1–12) Layers. After L. Sawicki.

Middle Horizon.—There is no bone in the middle horizon.

Upper Horizon.—

1. Flat points made of tubular bone (hare?).
2. A fragment of a bone plaque decorated with a geometrical design.

According to Ephimenko shells of *Dentalium* made into a small tube and cut on both ends (necklace?) were also found in this horizon.

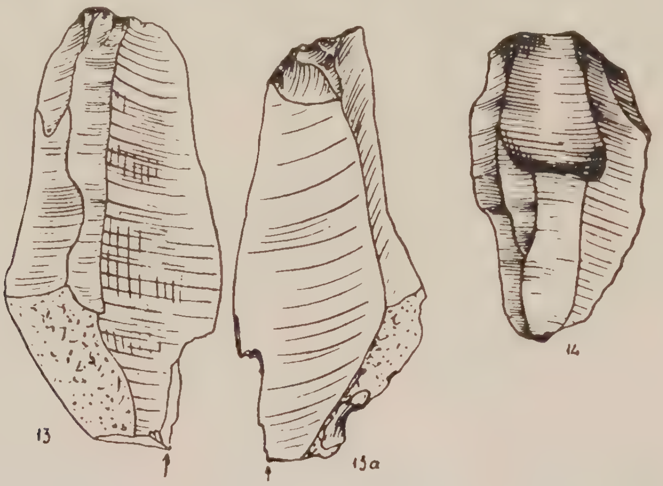

Fig. 80. Stone Industry of Borshevo II, Lower Layer. After L. Sawicki.

Dating.—According to the excavator, the lower and middle horizons of Borshevo II are quite similar to Gontzi, and are of late Magdalenian affinities.

The upper horizon, however, while having the same similarity to Gontzi, surpasses the latter in the size and regularity of the forms, almost approaching Epipalaeolithic. Ephimenko dates it as final Magdalenian, corresponding to the upper horizon of Cyrill Street (page 386) and Zhuravka (page 405).

16. Cyrill Street, Kiev

Location.—This site is located in the heart of Kiev on Cyrill Street, Podol section, near Yordan Church, which is at the foot of one of the branches of hills, that run along the Dnieper River. Two large gullies separate it from the river.

Discovery.—It was discovered, in 1893, by V. V. Khvoiko,[1] who made excavations in 1893, 1894, 1895, 1896, and 1899, in which V. B. Antonovitch[2] and P. Y. Armashevsky[3] participated. Unfortunately, this extremely interesting and enormous site was very badly investigated. Excavations of Khvoiko in 1893–1896 were done on a very small scale due to the expense involved in clearing the overlying layers, which were several hundred feet thick. Later, in 1899–1900, the owner of the land made large excavations of spondyl clay for his brick factory. During this time about nine thousand square meters of the site were opened in the presence at Khvoiko whose observations, of necessity, could not be very detailed.

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[1] Khvoiko, V. V., "The Stone Age of the Middle Dnieper Region," Trudi of the XI Archaeological Congress, Vol. I; also, "The Kiev-Cyrill Street Site and the Magdalenian Culture," Archaeological History of the South of Russia, 1903, No. 1.

[2] Antonovitch, V. B., "The History of Habitations in the Territory of Kiev from Palaeolithic Times to the Beginning of Christianity," "Kievskoe Slovo," 1896, No. 2927.

[3] Armashevsky, P. Y., "The Palaeolithic Site of Cyrill Street in Kiev," Izvestia of the XI Archaeological Congress, Vol. II, pp. 142–144.

Geology.—According to Armashevsky, as quoted by Gorodzov,[1] the geological structure of the site is as follows:

I. Humus.

II. A series of formations of undoubtedly Quaternary age, with a total thickness of 32 meters as follows:

1. Loess, which formed during the third interglacial period, but whose diluvial shifting did not take place until the fourth glaciation. The loess, being light, is very susceptible to diluvial processes of shifting by precipitation waters. During the fourth (Würm) glaciation, when atmospheric precipitation was increased, a considerable shifting of loess took place from the higher points to the slopes, as is evident in the present section.
2. Various marl formations of post-glacial origin. Gorodzov supposes that the marl layers were deposited by the waters of the third glaciation. The height of this horizon, which lies twelve hundred and eighty feet above the present level of the Dnieper, shows that during the period of its formation the river did not have the present deeply furrowed bed.
3. A layer of yellow-red-gray moraine clay, containing strata of coarse sands. The clay abounds in large and small boulders of granite, gneiss, diorite, quartzite, and limestone, carried over from the northern mountains of Scandinavia, Finland, and Valday. (Gorodzov states that this deposit was made by the third (Riss) glaciation.)
4. A layer of marl loam with a thin layer of dark reddish-gray clays similar to those of group III (see below). In this horizon are found remains of fresh-water molluscs of the genus *Limnaeus*, *Planorbia*, etc., indicating that this layer was deposited by river or lake waters.

III. A layer, forty five feet thick, containing a series of red-gray spotted kaoline pottery clays. The age of this stratum is undetermined but it is thought to be post-Tertiary.

IV. A layer of gray-white and then pure white quartz sands, sixty-three feet thick. No fossils were found in it, but because of the proximity to the greenish sands, this layer is attributed to the same Tertiary age, having been deposited by the drying and receding sea.

V. Greenish sands 45 feet thick, are called by Armashevsky "ameroid" because of the presence of pieces of amber in the upper layers. This amber is the pitch of ancient pine trees that grew on the shores of the sea which deposited the green sands. Besides amber, stems and roots of sea plants are found in this layer.

VI. At the base are spondyl clays with a total thickness of one hundred feet, of which some seventy-five or eighty feet are above the level of the Dnieper. They are bluish in color; green when dry. The clay is very plastic and contains separate bones and even whole skeletons of fish and many marine shells, one of which, *Spondylus Buchii*, is responsible for the name. Sponges, starfish, corals, plants of the lentil family, pines and tropical palms are also found. The presence of the latter indicated that the formation took place in sea waters near a very fertile continent.

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[1] Gorodzov, V. A., "Archaeology, The Stone Age," Moscow, 1925, Vol. I, pp. 232–39.

During the retreat of the Würm glacier, the raised waters of the Dnieper washed off all these deposits down to the level (VI) of spondyl clay. The most ancient cultural deposits of the Cyrill Street site were found under the steep slope of the shore on the surface of the exposed layer of spondyl clay.[1] This layer was in the form of a terrace some 450–475 feet wide. At its base were the waters of the Dnieper, on the other side was the steep shore of Kiev. This spot was an ideal habitation, and man used it. As time passed, the surface of this terrace-like platform was covered with material falling from the steep hilly shore. There were boulders of various crystalline formations from the moraine clay covering the high bank, and loose sands, among which were multi-colored sands of Tertiary and Quaternary deposits, that gave to this new layer a greenish-gray color.

Man remained under these new conditions, as the greater part of the kitchen refuse was found at the base of this debris. The process continued until the sand layers reached a thickness of 28–30 feet. Some of the layers became ferrous sandstone, others acquired a schistous structure. Only after this, the diluvial loess was deposited, reaching a thickness of forty feet. All these enormous changes took place during the IV (Würm) glaciation. Thus, the cross section of the site at the place of finds shows:

1. Humus.
2. Loess.
3. Clayish sands.
4. Sand.
5. Sand.
6. Sand.
7. Fine sands with pebbles.
8. Gray sands with three horizons of culture finds.
9. Blue spondyl clay.

The geologist, N. I. Krishtafovitch, agrees with Armashevsky that the age of the whole geological complex covering the cultural remains, including the gray sands containing them, is of post-glacial times. He thinks, however, that the gray sands with the cultural remains and mammoth bones in the section of Kiev, as described by Armashevsky, were deposited during a period synchronous with the last glaciation [2]

Fauna (according to Gromov [3]).—

1. *Elephas primigenius* (many).
2. *Rhinoceros tichorhinus.*
3. *Bison* (*priscus*).
4. *Ovibus moschatus.*
5. *Alces alces.*
6. *Gulo gulo.*
7. *Felis leo.*
8. *Marmota* sp.
9. *Spalax microphtalmus.*
10. *Ellobius talpinus.*

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[1] Armashevsky attributes all formation of the terrace deposits to washing out, disregarding the deposits laid by the river during the abatement of its course.

[2] Krishtaphovitch, N. I., "The Post-Tertiary Formations in the Neighborhood of Novo-Alexandria," Warsaw, pp. 65–66.

[3] Gromov, V. I., "Geology and Fauna of the Palaeolithic Period in U.S.S.R.," Problems of the History of Material Culture, No. 1–2, Leningrad 1933.

An important feature of the Cyrill Street site is the fact that its cultural remains are found not in one, but in several horizons, showing that we are dealing here with several succeeding habitations.

The Lower Horizon.—The oldest cultural horizon lies on the spondyl clays. In it were found traces of two fireplaces,[1] containing ashes, charcoal, charred wood, bones, a considerable number of flint tools, several worked bones of mammoth, pieces and even whole trunks of petrified cedar and pine, a quantity of mammoth bones, most of which were tusks, and one skull of *Rhinoceros tichorhinus.*

The best preserved and investigated hearth was long and irregular in shape, forming a large thick layer, fifty meters long, fifteen meters wide and forty to fifty cm. thick.[2] It consisted of ashes, charred bones and wood, and large quantities of mammoth bones (jaws with tusks, leg bones, shoulder blades, and vertebrae) on its periphery. On one side there were more tusks than bones which sometimes lay in piles. Only few bones of other animals were found. Altogether, there were fifty-three mammoth jaws and over one hundred tusks, constituting, according to Volkov, the remains of sixty-seven individual animals.[3] Toward the hill the quantity of ashes and bones decreased. At that end were found one large bone of some animal, and three trunks of coniferous trees, two meters long and 30 cm. thick, one with part of the roots preserved, all of them with burned ends.[4]

In other hearths charcoal was more often found, sometimes in nests of one and a half meters in diameter, always containing an agglomeration of large charred bones and ashes.

The flint implements are in the form of small sharp flakes, such as are often found in neolithic workshops (Plate XXXIII).[5] The larger type of flint tools is absent. Among the bone work are notable:

1. A young mammoth's tusk about six feet long with a groove chiseled along its length, covered by a quantity of notches, made by heavy blows of a flint tool[6] (Fig. 82).
2. Part of another tusk, seven inches long, the surface of which was engraved with a design partly obliterated by time. Some investigators distinguish among ornamental figures the outline of a bird with the eye and the figure of a turtle[7] (Fig. 81, Plate XXXI).

The find of mammoth bones associated with the bones of *Rhinoceros tichorhinus* in the lower layers of this site testifies, in the opinion of Gorodzov, to the considerable antiquity of the site.

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[1] Three according to Spitzin, A. A., "The Russian Palaeolithic Period," Zapiski of the Imperial Russian Archaeological Society, Slavic Division, Vol. XI, Petrograd, 1915, pp. 132–172.

[2] Spitzin, A. A., "The Russian Palaeolithic Period," Zapiski of the Imperial Russian Archaeological Society, Slavic Division, Petrograd, 1915, Vol. XI, pp. 132–172, Fig. 12.

[3] Volkov, Th. (Th. Vovk), "The Prehistoric Finds in Cyrill Street, Kiev," Zapiski of Scientific Society of Shevchenko in Lvov, No. 1, 1898.

[4] According to Gorodzov, V. ("The Results of Archeological Activities in U.S.S.R., During 1917–1930." Manuscript), one of them, with part of the roots, had traces of notches, evidently made by a sharp tool.

[5] Illustrations available are far from being satisfactory, and the separations of horizons is not always clear. (E. G.)

[6] Volkov, Th., "Magdalenian Art in Ukraine," Zapiski of Scientific Society of Shevchenko in Lvov, Lvov, 1902, Vol. XLVI, pp. 1–13, Table I.

[7] According to Spitzin, A. A. ("The Russian Palaeolithic Period," Zapiski of the Imperial Russian Archaeological Society, Slavic Division, Vol. XI, Petrograd, 1915), it was later found accidently some distance from Khvoiko's excavations.

According to Gorodzov,[1] some of the bones were worked into implements (?) and with them were found flint implements in the form of scrapers and knife-like blades.

The bone tools were made of mammoth tusks and leg bones. Heavy clubs were made of tusks and gigantic adze-like implements of leg bones. In the latter case one end was cut obliquely and sharpened. The surface of some of them was covered with notches and other depressions.[2]

The Upper Horizon.—The upper horizon lies in the layer of gray sand. It may be further subdivided into two sections:

1. Some three and a half feet over the lower horizon were found remains of a charcoal layer, with a very small quantity of bones, mostly broken and charred.
2. Seven feet higher were found groups of hearths of a different character.[3] They were found in nests, round or oval in plan, and marked by ashes, charcoal, charred bones and very many small flint implements, hammerstones and flint pebbles stored for the manufacture of tools. About twenty such cultural nests were found, situated from six to sixteen feet above the lowest horizon and twelve to twenty-two feet beneath the foundation of loess. Mammoth bones were found rarely and only in small fragments, but with them were remains of:

Leo spaeleus.[4]
Hyena spaelea.
Ursus spaeleus.

None of the above animals was found in the lower horizon.

The Flint Industry.

The material found in the Cyrill Street site is not very plentiful, considering the area excavated. There is quite a difference of opinion in evaluating it. The older writers, like Spitzin, felt that one should treat the different horizons separately as belonging to different cultures. Gorodzov (1925) states that all flint industry of the Cyrill Street is of one cultural horizon.

The illustrations available [5] (Plates XXXII, XXXIII) do not always distinguish the horizons, but it seems advisable to consider the latest opinion of P. P. Ephimenko,[6] who, undoubtedly, is one of the best Russian specialists. He definitely distinguishes two periods:

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[1] Gorodzov, V. A., "Archaeology," The Stone Age, Vol. I, Moscow, 1925, pp. 232–239.

[2] Unfortunately there are no illustrations of these unparalleled implements. It is possible that Gorodzov refers to objects illustrated on Figs. 81, 82. (E. G.)

[3] According to Vishnevsky, B. N. ("Prehistoric Men in Russia," Appendix to translation of Osborn's "Men of the Old Stone Age," Leningrad, 1924, p. 462), "One gets an impression that on definitely outlined areas of hearths were shelters under which fires were built."

[4] According to Vera Malycheff, "Le Loess," Revue de Géographie Physique, 1929–30, Vol. II, III, also *Gulo* sp.

[5] Volkov, Th. ("The Prehistoric Finds in Cyrill Street, Kiev," Zapiski of Scientific Society of Shevchenko in Lvov, No. 1, 1898), gives a photograph of the lower, and some drawings of the upper horizon.

Zelizko, J. V. ("The Settlement of Diluvial Man in Kiev," Casopisi Vlasten Muzej Spolku, v. Olomouci, 1907, cislo 95–96, Olomouci, 1907), gives two plates of photographs without indicating the horizon, probably the upper.

According to Spitzin, the best illustrations are given by Grushevsky, "History of Ukraine," but not available to me. (E. G.)

[6] Ephimenko, P. P., "Pre-Clan Society," Leningrad, 1936, pp. 433–437.

Older Horizon.—The older horizon is characterized by a small number of tools (200 chips, flakes and unfinished objects). The majority of finds consists of small flint blades of the Upper Palaeolithic character, among which are some *burins.* All tools are made out of dark gray flint of chalk origin. The general aspect of the industry according to him is very near that of Kostenki I and Karacharovo.

From the point of view of dating, the objects made of mammoth tusk are of more importance. Thus, in this horizon were found the following:

1. A tip of a mammoth tusk 170 cm. long, and 13 cm. in diameter at the butt. Along the inner side of the curvature, starting from the butt and running three quarters of the length, there is a deep incision, triangular in cross section.

2. A fragment of the mammoth tusk, 21 cm. long and 4.5 cm. in diameter at the middle, has an engraved line with twenty-three smaller lines perpendicular to the first one, running at about equal intervals (Fig. 82, no. 2).

3. A larger fragment 21.5 cm. long and 6 cm. in diameter, had two parallel lines running lengthwise with nine perpendicular lines connecting them. Volkov suggests the possibility of a hunting record (Fig. 82, no. 1).

4. The most interesting object is the end of a mammoth tusk, 30 cm. long, covered with the engraved design (Plate XXXI) of rather complex and undeterminate character. Mr. Khvoiko distinguishes there (Fig. 81) a bird (*a*) and a turtle (*b*). J. V. Zelizko sees a lake landscape with a figure of the bird just alighting on the shore of the lake. Volkov pointed out the similarity of the ornamental motives to the examples of Magdalenian art in Western Europe. We have, according to Volkov, the following main elements:

A long line with perpendicular notches, similar to objects illustrated in Fig. 82, 1 and 2, which sometimes form a ladder design, (*c*). A zig-zag line, (*d*). Rows of semi-curves, (*e*). Curved lines with perpendicular notches, (*f*).

The technique of Cyrill Street engravings, according to Ephimenko,[1] is typically Magdalenian, but the high schematization and stylization of the subject matter resemble very much the female engraving of Predmost, and geometrical tendencies of Mezine. All this makes Ephimenko date this horizon as early Magdalenian.

The Upper Horizon.—The flint industry of this horizon is much richer than that of the lower one. Besides a very large quantity of the flint chips and flakes, there were found fine regular blades, nuclei, and large pieces of unworked flint as a supply for manufacturing, which was done on the spot.

Scrapers.—Scrapers are small in size and resemble very much the similar forms of Borshevo II and Gontzi.

Burins.—Burins are often made on small blades and are of medial and *bec de flûte* type; others are made on small pointed blades with finely retouched edges, having at times triangular and other geometrical forms, quite similar to microlithic types.

Ephimenko [2] considers the upper horizon of the Cyrill Street of very late Magdalenian, almost a transition to the Azilian. Gorodzov, however, places both horizons of Cyrill Street in the time corresponding to the Solutrean in Western Europe. He definitely states that, "The east European cultures of the middle period of the Palaeolithic (our Solutrean) are absolutely alien to the corresponding cultures of Western Europe." According to

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[1] Ephimenko, P. P., "Pre-Clan Society," Leningrad, 1936, p. 437.

[2] Ephimenko, P. P., "Pre-Clan Society," Leningrad, 1936, pp. 448–450.

Vishnevsky,[1] the German investigators called it Aurignacian on the basis of the similarity of the design on the tusk to the bone engravings of Predmost.[2] Volkov comparing it with the Madgalenian of France derives this culture from the West. Khvoiko derives it, together with the mammoth and the reindeer, from the northeast. Vishnevsky seems to take the

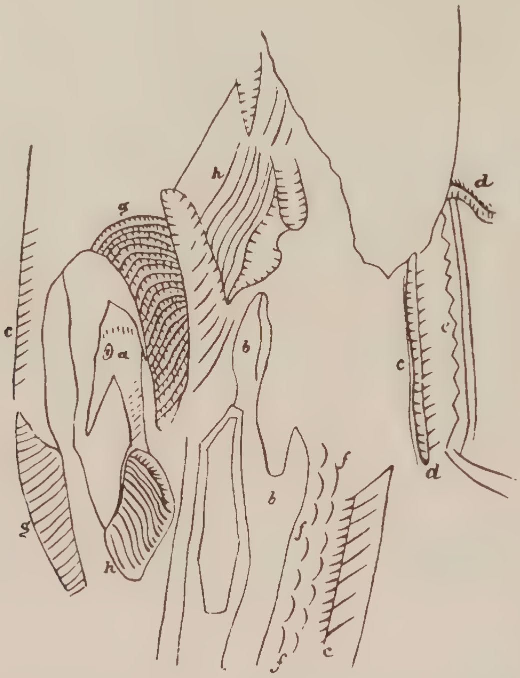

FIG. 81. Enveloped Design of the Engraved Mammoth Tusk from Cyrill Street. After Volkov.

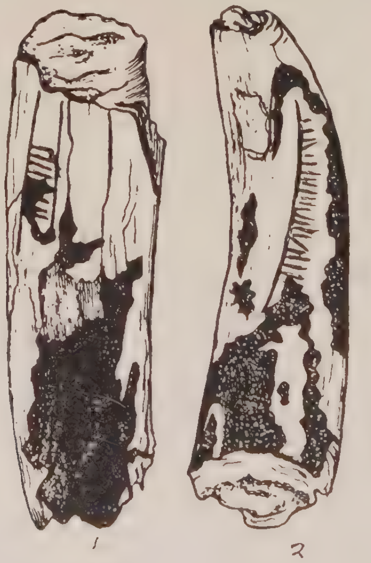

FIG. 82. Mammoth Tusk with Engraved Notches from Cyrill Street. After Volkov.

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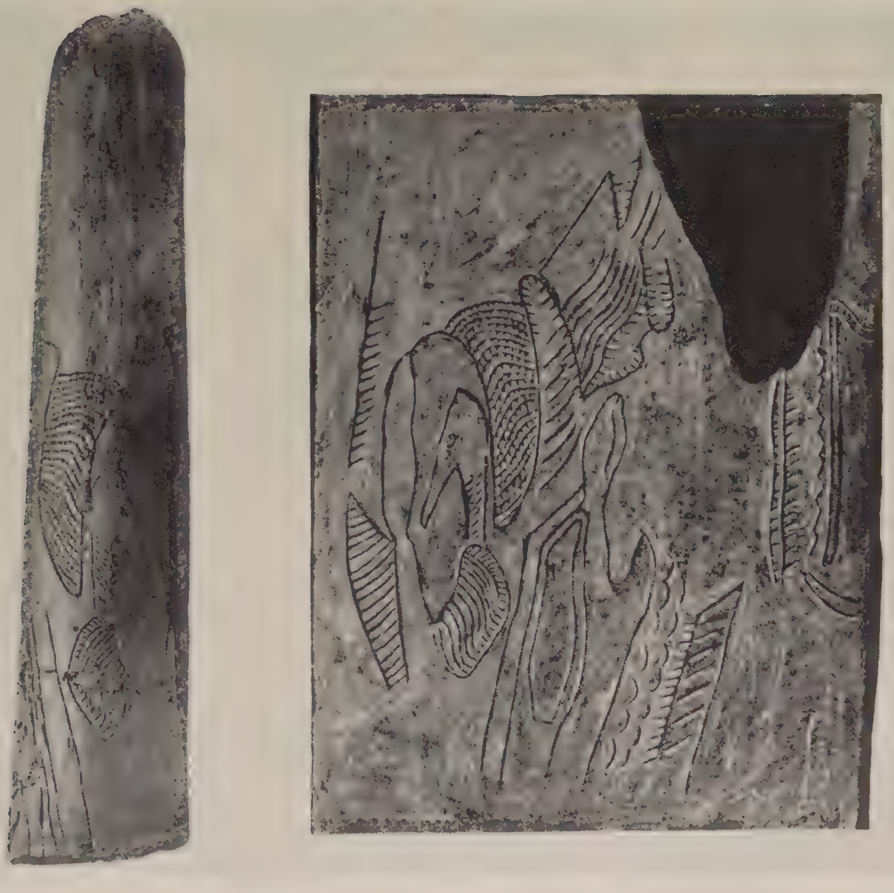
[1] Vishnevsky, B. N., "Prehistoric Man in Russia," Appendix to translation of Osborne's "Men of the old Stone Age," Leningrad, 1924.

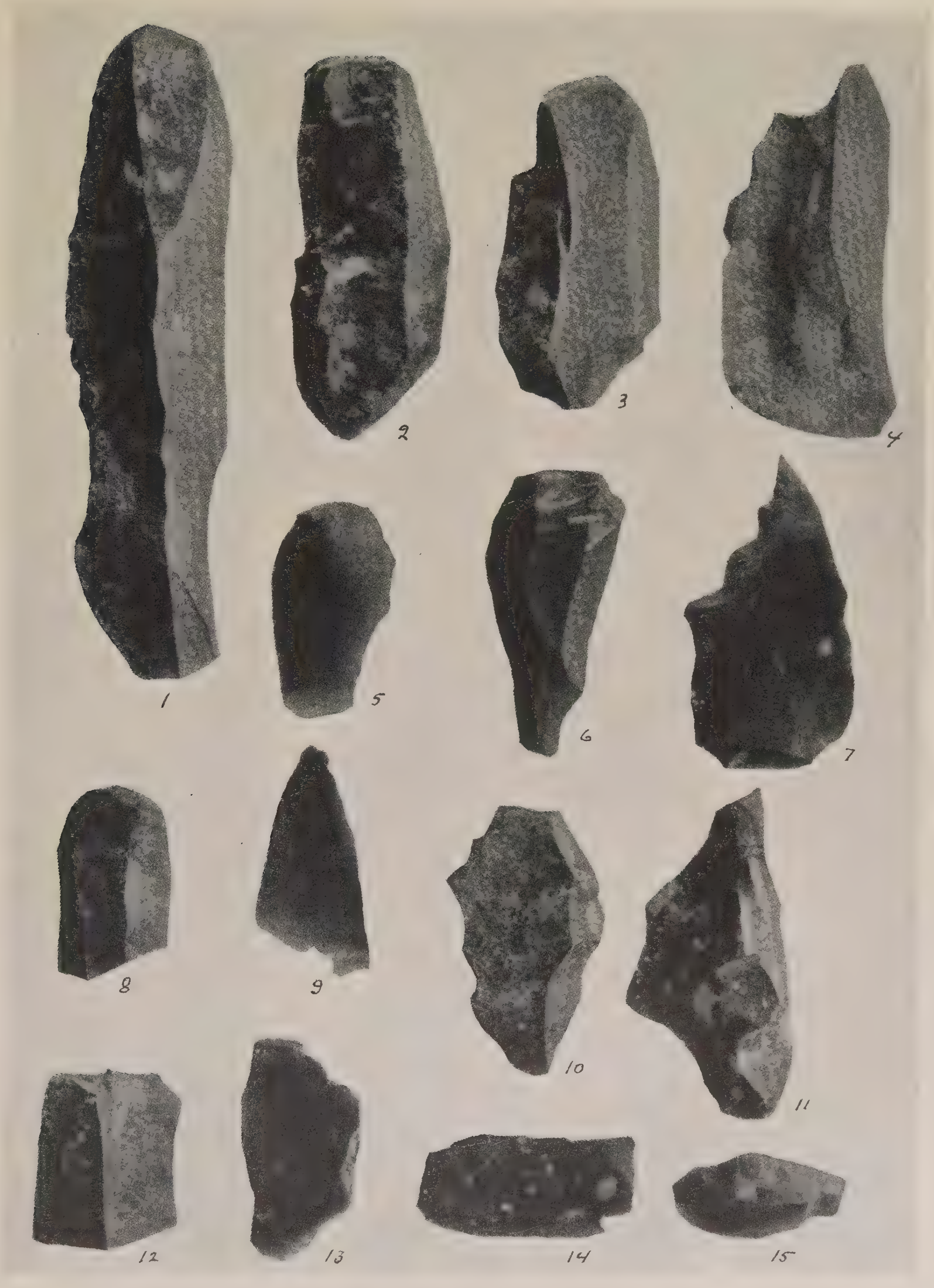
[2] Ebert, Max ("Reallexicon der Vorgeschichte," p. 32), says that the stone industry "suggests early Aurignacian."

PLATE XXXI.



Engraved Mammoth Tusk from Cyrill Street. After Khvoiko.

PLATE XXXII.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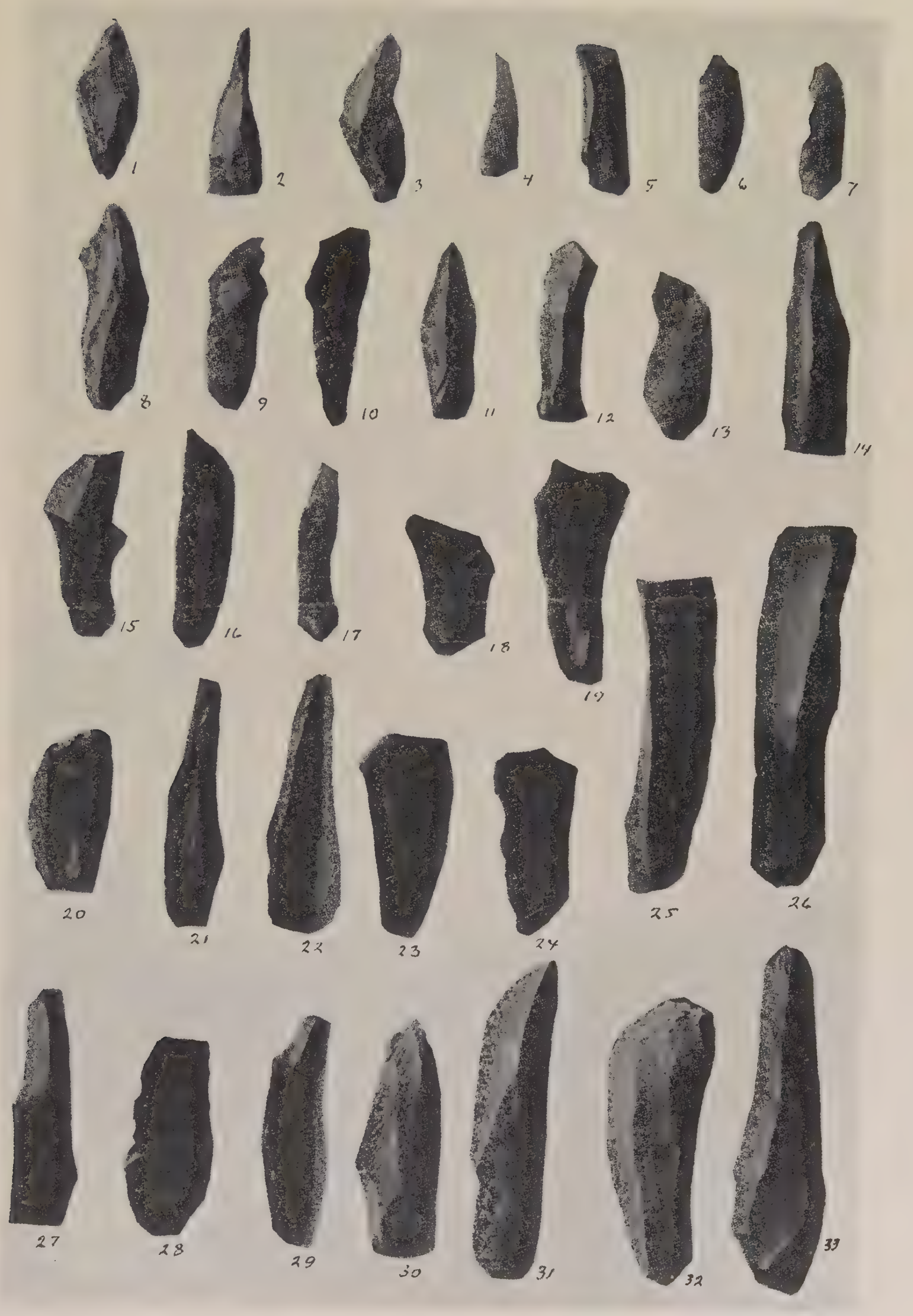
Stone Industry of Cyrill Street. Probably Upper Horizon. After V. Želízko.

PLATE XXXIII.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STONE INDUSTRY OF CYRILL STREET. Probably Lower Horizon. After V. Želízko.

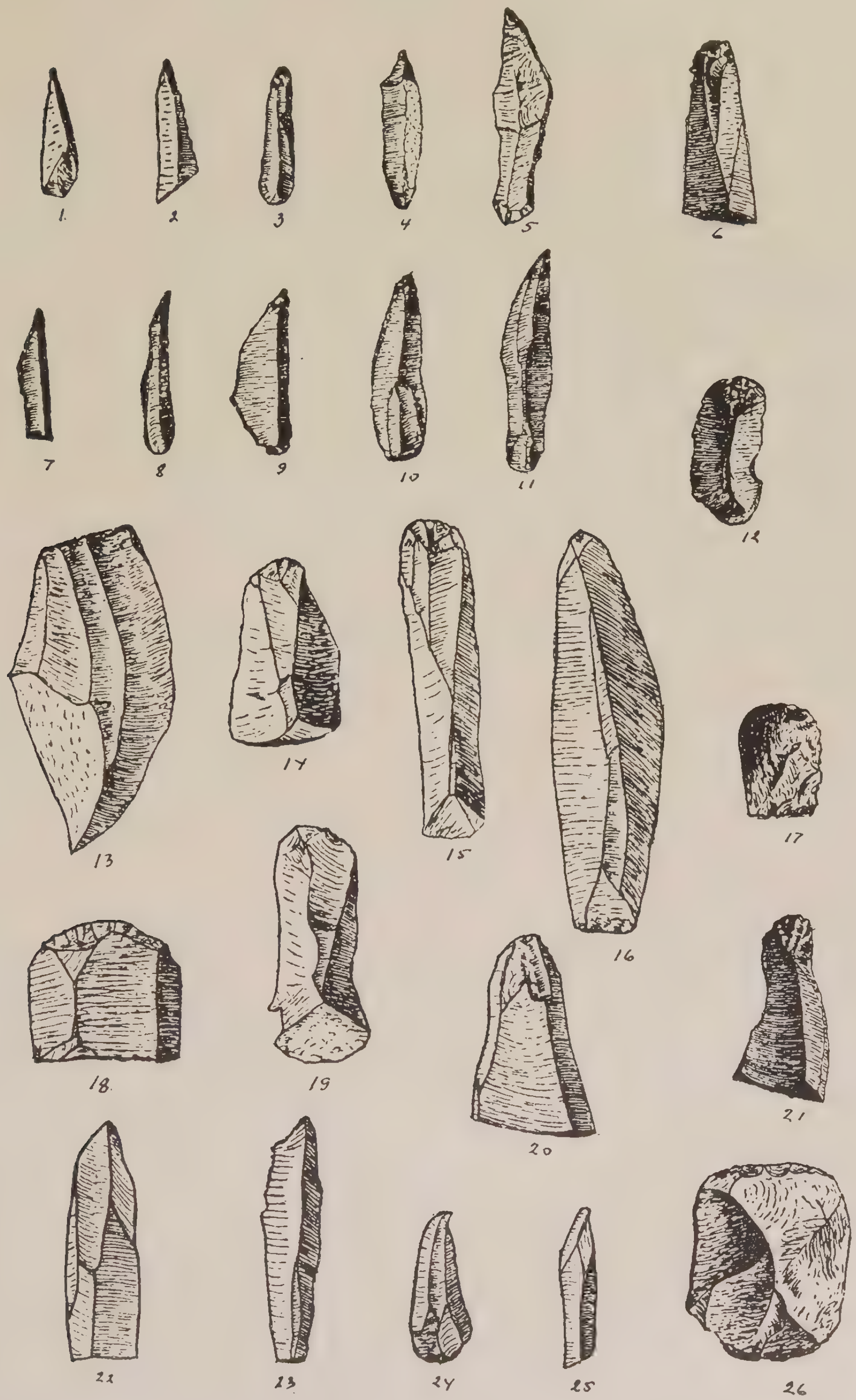
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Fig. 83. Stone Industry of Cyrill Street. Excavations of 1898. Probably Upper Horizon. After Volkov.

point of view of Spitzin that the remains of Cyrill Street belong to at least three different periods of Palaeolithic time.

17. SUREN II

Location and History.—Suren II was discovered by K. S. Merezhkovsky at the same time as Suren I in 1897. It is situated next to the latter (see p. 289).

Merezhkovsky collected [1] a rich flint industry of small implements, a great part of which were small end scrapers, often made of very short blades and flakes; gravers (middle and side), perforators (?), and peculiar flint points, either accidentally pointed, slightly retouched blades, or much better made ones, with pressure flaking along the edge.

Merezhkovsky adds very little about this site, beyond indicating that he found cultural layers similar to those in Suren I. The industry seems to be very like that of the upper horizon of Suren I.

The excavations of G. A. Bonch-Osmolovsky in 1924, added the following facts to our knowledge of this site:

He describes [2] Suren II as a rock shelter, very similar to Suren I. The stratigraphy corresponds to Merezhkovsky's:

1. A shallow contemporary layer with large slabs fallen from the ceiling, 25 cm.
2. A thick deposit formed by similar slabs of limestone with incrustations of grey clay in the upper part and yellow clay in the lower. Here, at a depth of 50 cm. from the surface, was found a cultural layer with a "hearth" black in color, 10–15 cm. thick.
3. Beneath this at a depth of 3.70 meters is a sterile layer of larger slabs of limestone with streaks of bright grey, wet clay.

Fauna.—The bones of the following mammals were found:

1. *Equus caballus.*
2. *Equus asinus.*
3. *Cervus elaphus.*
4. *Cervus megaceros* sp.
5. *Saiga tataricus.*
6. *Canis lupus.*
7. *Canis familiaris.*[3]#
8. *Vulpes vulpes.*
9. *Vulpes corsac.*#
10. *Meles meles.*#
11. *Felis leo.*
12. *Felis lynx.*
13. *Lepus europeus.*
14. *Ochotona pusilla.*
15. *Castor fiber.*
16. *Cricetus cricetus.*#
17. *Cricetus (cricetulus) migratorius.*#
18. *Mus sylvaticus.*#
19. *Microtus arvalis.*#
20. *Lagurus luteus.*#
21. *Ellobius talpinus.*#
22. *Alactaga jaculus.*#
23. *Alactaga elater.*#
24. *Scirtopoda telum.*#

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[1] Ephimenko, P. P., Some Results of the Study of Palaeolithic Period in U.S.S.R., "Chelovek," No. 1, 1928, Leningrad, p. 57.

[2] Bonch-Osmolovsky, G. A., "Le Paleolithique de Crimée," Bulletin of the Quaternary Committee, No. 1, 1929.

[3] The fauna marked # were added from Gromov, V. I., "Geology and Fauna of the Palaeolithic Period in U.S.S.R.," Problems of the History of Material Culture, No. 1–2, Leningrad, 1933.

Fish:

1. *Rutilus frisii.*
2. *Lucioperca luciperca* (L.)

Flora.

Populus (*tremula*)?

Flint Industry.

Flint tools and chips of the same character were found over and under the hearth layer. This fact can be explained by the cavities in between the slabs, where the tools may have fallen. Many skeletons of rodents indicate the possibility of another explanation.

The flint industry is represented by upward of one hundred tools and many chips. Most of them are made of long and backed blades, which gives a fine aspect to the industry. We have various gravers, drills, scrapers, points (arrowheads?). The polyhedric massive gravers and nuclei-like scrapers are totally absent; the ordinary gravers and scrapers made on ends of blades, are small and more blunt. The most typical forms are definitely geometrical; less numerous are those of the segment type and arrow points (?) with an almost Solutrean retouch on the ends. One is impressed by the fact that each tool is quite skillfully made and highly specialized. These points which are called by Polish archaeologists "points of Font-Robert type of special kind" are very common in Mesolithic cultures of Poland and Western Russia.

Dating.—In his earlier work, Bonch-Osmolovsky (1925), was inclined to date Suren II as belonging either to the end of the Magdalenian or to Azilian. Finally, in his later summary (1929) he definitely assigns it to Azilian times in accordance with the local conditions of the Crimean Palaeolithic. He adds that, "In its general aspect the industry of Suren II approaches that of the lower horizon of the cave Urkusta, which is a little more perfected, but has arrow points completely analogous to those of Suren II." [1]

No illustrations of flint material are available.

18. Timonovka

Location.—Timonovka is situated on the right bank of the Desna River, in the village of Timonovka, 4 km. below the town of Briansk and 4 km. above the village of Suponevo (see page 401).

The site is located on a narrow plateau, formed by a deep gulley "Pereulok" on one side, and the steep slope of the Desna River on the other. This plateau is roughly triangular in shape, and on the narrow end of it are orchards and buildings of the section "Strelitza" of the village.

History.—It was discovered independently, in 1927, by M. V. Voevodsky and the expedition of V. A. Gorodzov. Later it became the object of an intensive study by V. A. Gorodzov, who conducted large excavations there in 1929–1931 and 1933.

In 1928 Voevodsky [2] made five soundings and a trial excavation 4 by 0.5 meters and collected some surface material. His preliminary work showed that the cultural layer lay immediately under the humus and was composed of gray compact sandy clay 7.17 cm. thick, also rich in humus. This layer was literally stuffed with flint implements.

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[1] Bonch-Osmolovsky, G. A., "Le Paleolithique de Crimée," Bulletin of the Quaternary Committee, No. 1, 1929.

[2] Voevodsky, M. V., "The Palaeolithic Site of Timonovka," Russian Anthropological Journal, Vol. XVIII, pt. 1–2, 1929.

Geology.—A more detailed study of the geological conditions of Timonovka was made by G. F. Mirchink. According to him [1] the main bank shows the following cross section:

I. Humus.
II. Loess, which Mirchink dates as Würmian.
III. Ancient humus (badly preserved).
IV. Fluvio-glacial formations consisting of a layer of sands and loess-like sandy clay of Riss age.
V. Chalk-like marls, chalks, and glauconite sands.

According to Mirchink, previous to the formation of the fluvio-glacial Riss deposits (IV), or partly during the process of this formation, the terrace-like slope of the Desna River was cut by a series of deep gullies, one of which borders the village from the north, the other separating Timonovka from the Svensk monastery. These gullies were partly filled by fluvio-glacial formations, and then were covered by the deposit of loess in Würmian times, which was later washed away.

The cross section at the head of the smaller gully "Pereulok," where it lies 30 meters above the level of the river, shows:

I. Humus.
II. Fluvio-glacial formations of loess-like sandy clay, red-gray in color—4 meters thick (Riss).
III. Yellow, fine-grained quartzite sand, 2 meters in thickness.
IV. Marls and glauconite sands.

On the surface of layer II were found the cultural remains. Mirchink states that at the place of the site, as in many other spots examined, the layers of loess and ancient humus were washed away (II, and III of the first cut). He concludes, therefore, that the Timonovka site is either younger than the time of the deposition of the Würmian loess, or is synchronous with the last stages of its formation. The gully "Pereulok" did not exist at that time and was formed later.

Fauna.—Most of the bones found were in such a state of decomposition that only greasy spots of dark soil revealed former places of bone accumulation. Only one tooth of mammoth was preserved.

Flint Industry of Voevodsky's Excavations (Plates XXXIV, XXXV, XXXVI).

The stone artifacts found were made of fine, dark gray flint, still found in the vicinity some 10 km. from the site. The local flint, which crops out in many places on the shore of the Desna, is of very poor quality and was not used.

All tools found are patinated, with light blue film when it is thin, and bright-white, when patination is deep. Some artifacts show remnants of a yellow chalky crust.

Nuclei (Plate XXXV, no. 1).

Blades (Plate XXXV, nos. 2, 3, 4) are usually short 4–5 cm., quite wide and irregular. Only a few long blades with parallel edges were found.

Flakes are found in large quantity of various sizes. Some are large and massive.

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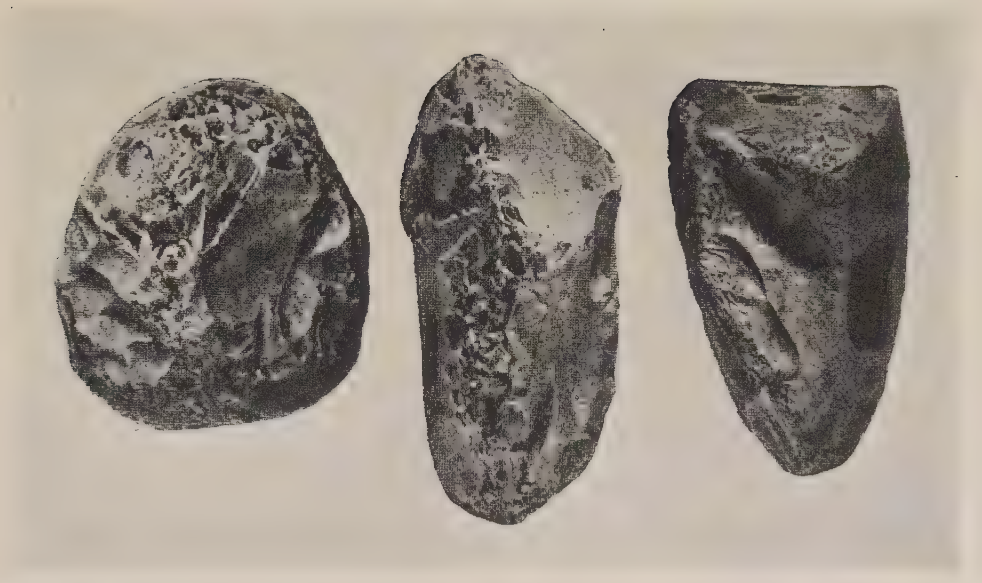
[1] Mirchink, G. F., "The Geological Conditions of Timonovka Near Briansk," Russian Anthropological Journal, Vol. XVIII, Part 1–2, Moscow, 1929, pp. 57–58.



The Hammerstones from Timonovka. After Voevodsky. 1, 2, hammerstones (*percuteurs*); 3, the intermediare tool (*utile intermédiaire*).

End-scrapers of Two Types:

1. Scrapers made on the end of a blade (Plate XXXV, nos. 6, 7, 8) slightly convex, with a steep working edge, formed by a fine regular retouch. In one case both edges are retouched (no. 8).
2. Scrapers made on a flake (Plate XXXV, nos. 5, 9–15) have many different forms such as round scrapers with the peripheral retouch (no. 9), and square ones (nos. 11, 14).

Burins.—

Burin d'angle-grattoir (Plate XXXV, no. 16; Plate XXXVI, no. 5).

Burins d'angle (Plate XXXVI, no. 7) have a well retouched end, some of them approaching microlithic proportions (Plate XXXVI, nos. 6–7). An example of *burin d'angle* with transversal revivification blow is shown on Plate XXXVI, no. 9.

Burin bec de flûte (Plate XXXVI, nos. 8, 20).

Multifacetted *burins*, and double *burins* (nos. 10, 19).

Lames with retouched ends in which Voevodsky sees unfinished *burins d'angle* minus the *burin* stroke (nos. 13, 14).

Lamelles á dos rabbatu (no. 17).

Lame retouched on both sides (no. 18).

Nucleiform *burin* (no. 21).

The tool represented on Plate XXXVI, no. 15, is, according to Voevodsky, a new type of *burin*, first established by P. P. Ephimenko in the neighboring site of Suponevo (see page 401). The burin facet is formed by lateral retouch of the flake and transversal blow.[1]

Graver flakes (Plate XXXVI, nos. 11, 12).[2]

Hammer stones (Plate XXXIV, no. 3).

Intermediate tool (Plate XXXIV, no. 3), according to L. Sawicki, quoted by Voevodsky, was used between the nucleus and hammerstone to obtain flakes (?).

Voevodsky gives the following table of the quantitative relations of the types found.

Nuclei, 11.
Knife-like blades (*lames*), 170.
Scrapers on the end of knife-like blade (*grattoirs sur le bout de lame*), 14.
Scrapers on flake, 22.
Side gravers (*burins lateraux*), 71.
Side-middle gravers (*burins medans lateraux*), 3.
Gravers on the corner of broken blade (*burins à angle de lame brisée*), 14.
Other gravers, 7.
Prepared flakes for the side gravers (*ebauche pour les burins lateraux*), 21.
Flakes from the gravers (*eclats lateraux*), 14.
Dulled back blades (*lames à dos rabbatu*), 2.

In general, the Timonovka flint industry seems to be decadent and similar to such stations as Gontzi, or the upper horizon of Borshevo II, both of which are late Magdalenian according to P. P. Ephimenko.

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[1] Possibly no. 16 is the same type as "*burin transversal.*" (E. G.)

[2] The first according to P. Kelly is *burin de noaille.*

This decadent tendency is especially seen in the knife-like blades which are rather short and wide; there is an absence of regular long blades, so characteristic for the earlier stations of Kostenki I and Mezine. It is especially accentuated by the fact that many tools are made not on blades but on rather irregular flakes. The technique seems to be very negligent. The paucity of forms, the absence of drills, scarcity of blades with retouched backs, the small size of the average tool, the absence of the "finger retouch" which is so characteristic of the Russian Solutrean cultures, the absence of the multifaceted gravers, a certain geometrical character of scrapers, all speak for the Magdalenian period of the Upper Paleolithic.

Further investigations were made by V. A. Gorodzov, on a much larger scale in 1928, 1929, 1930, 1931 and 1933, resulting in much additional material and the discovery of four Palaeolithic habitations in the shape of large underground huts. Unfortunately, the results of Gorodzov's excavations are as yet unpublished, and only a very summary account based on a short article,[1] personal conversations with the excavator, and the notes on his lecture in 1933 is given below.[2]

Gorodzov's Excavations.—The total area of the site is estimated by Gorodzov as equal to 10,000 square meters. Up to now only 1,118 square meters or about one-eighth of the total area is excavated.

Fauna.—Though Gorodzov also reported on the poor preservation of bones in some sections of the site, the other produced sufficient quantity to enable Mme M. B. Pavlova to identify the following animals:

Mammoth.
Reindeer.
Elk.
Antelope.
Bos (sp.).
Bear.
Wolf.
Arctic fox.
Rodents.

The majority of bone remains are found in the ashes of the fireplaces, these in loess are completely disintegrated.

Flint Industry.

Fine flint of chalk origin, found in the vicinity of the site, furnished the principal material for the flint industry. Judging by the quantity of the chips and stone artifacts found, the manufacturing of tools took place on the spot. During the five years of investigation approximately 105,000 flint flakes and finished tools were found. Out of the 42,000 found during the season of 1933, 8,297 are finished tools. Gorodzov does not give any description of the tools beyond indicating the quantitative distribution of the general types. Thus, out of 24,842 finish-implements found there were:

Nuclei	1,114
Rabot	38
Knife-like blades	10,478
Gravers	7,984
Scrapers	1,386
Hammerstones	9[3]
Other types	3,733

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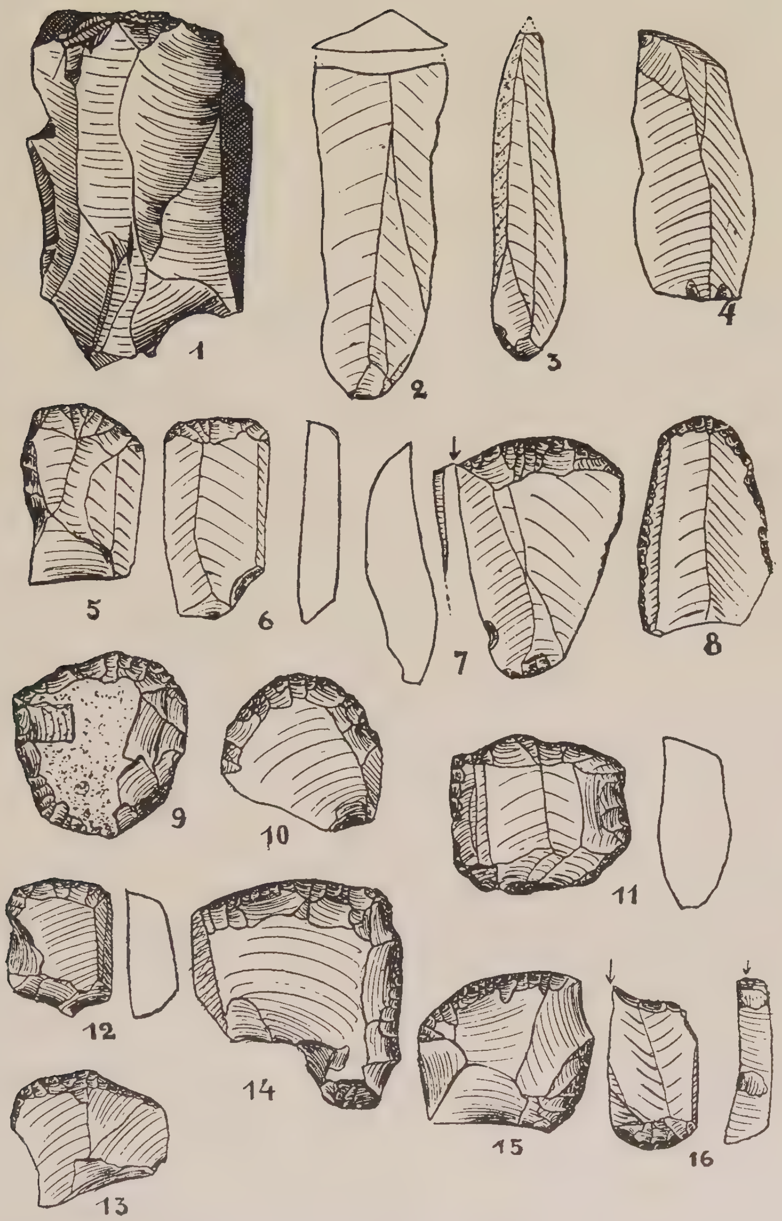
[1] Gorodzov, V. A., "Preliminary Account of the Investigations of the Palaeolithic Site of Timonovka, Near Briansk," Soobschenia of the State Academy for the History of Material Culture, No. 11–12, pp. 55–57, Leningrad, 1932.

[2] See also Golomshtok, E. A., "Trois gisements du paléolithique supérier russe et sibérien," L'Anthropologie, t. XLIII, 1933, pp. 311–327.

[3] The unusually small number of hammerstones is unexplicable. (E. G.)

PLATE XXXV.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Stone Industry of Timonovka. After M. Voevodsky.

It is interesting to point out that outside of the area occupied by the dwellings the finds of flint and bone implements were very negligible. Thus, during the excavations of 1931, there were 36,000 objects found, 25,000 of which came from one hut. Altogether some forty thousand flint tools and chips were found in these dwellings during four seasons of work.

Hut no. 1	5,000
Hut no. 2	5,590
Hut no. 3	(not completely excavated)
Hut no. 4	30,864

A very large number of gravers was found, hut no. 4 yielding 3,253; the record quantity for all Russian Palaeolithic stations.

The stone industry is represented by nuclei, knife-like blades, scrapers on the end of a flake or blade, side gravers, side-middle gravers, gravers made on the end of a broken blade. In general the industry is characterized by the decadence of technique, a smallness of size, and a similarity of some of the forms to the Azilian. Many tools are made negligently on irregular flakes.

Bone Industry.

A number of bone objects were found, the most interesting of which are shaftings for flint implements made of the tusk of a young mammoth; one of them is of a large size and is covered with a finely engraved geometrical design. On the fragment of the tusk of a mammoth was found an engraving representing a small fish, with well-outlined scales, fins and tail. Several pieces of large mammoth tusks found had deep notches made by the gravers, for the purpose of separating the splinters for manufacturing of small objects such as needles, awls, etc. A number of bone fragments covered with engraved geometrical designs, bone awls made of the tubular bones of the arctic fox, perforated bone needles, the fragment of a needle container with ownership marks, and a number of carved objects were found.

The presence of a large number of gravers, almost 20 per cent. of the tools found, and such auxiliary tools as stone polishers and bone sharpeners made of flat slabs of quartzite and sandstone, likewise numerous, speak of a well developed bone industry.

Of quite unusual character are the small stone lamps made of soft gray stone. Two smaller ones are whole; the third and largest is in fragments.[1]

The Dwellings.—The most interesting part of the Timonovka site is the discovery of well-pronounced remains of semi-subterranean huts. During the five years of excavation, the remains of six semi-subterranean huts, rectangular in their ground plan, were uncovered. Gorodzov distinguishes two general types:

(*a*) With the entrance at the long end (Fig. 84, no. 1).
(*b*) With the entrance at the middle of the long side (Fig. 84, no. 2).

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[1] Unfortunately no illustrations of these important finds are available to me. (E. G.)

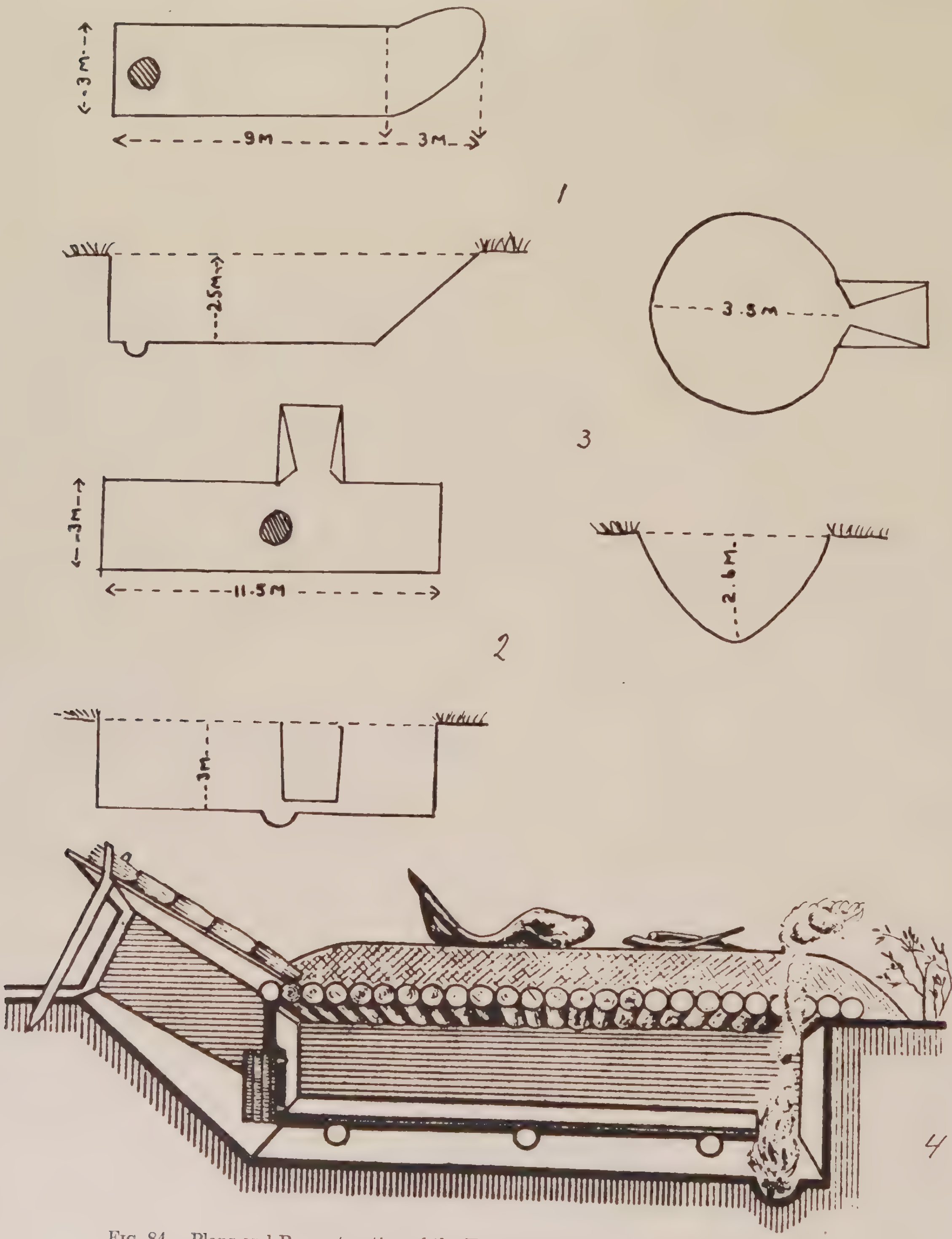
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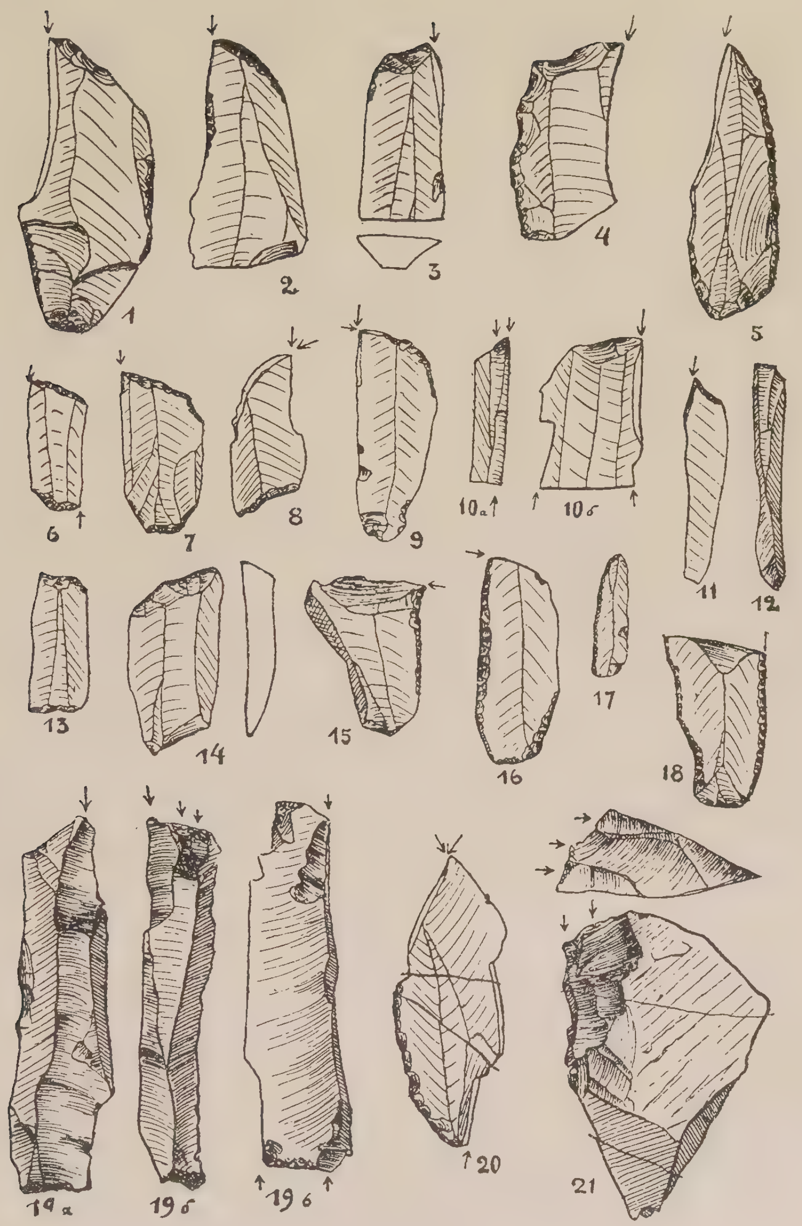
Fig. 84. Plans and Reconstruction of the Timonovka Dwellings. After V. Gorodzov.

PLATE XXXVI.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STONE INDUSTRY OF TIMONOVKA. After M. Voevodsky.

The following dimensions are given:

Hut no. 1, 12 x 3 x 2.5 meters.
Hut no. 2, 12 x 3.5 x 3 meters.
Hut no. 4, 11.5 x 3.5 x 3 meters.
Hut no. 5, ? x 3.5 x 2.8 meters. Excavations not completed.
Hut no. 6, 11.5 x ? x ? meters. Excavations not completed.
Hut no. 7, 11.5 x 3 x 3 meters. Excavations not completed.

The huts no. 1 and 6 have hearths in the shape of round pits 0.70 and 1.10 meters in diameter and 0.25 and 0.50 meters in depth respectively. Both fire pits were dug in the main floor of the dwellings and were filled with ashes and small bits of charcoal. Over the hearth of dwelling no. 6, there was a chimney in the roof made of bark covered with clay, conical in shape, 0.70 meters high and 0.60 meters at the upper diameter and 1.10 meters at the base. The roofs, in the case of hut no. 1 and 6, were flat, made of horizontally laid logs, (see reconstruction Fig. 84, no. 4) and covered by earth over which was accumulating the kitchen refuse.

Besides the remains of the huts, Gorodzov indicated the presence of storage pits (Fig. 84, no. 3), round and conical in shape, and bearing the following dimensions:

Pit no. 1, 1.60 meters in diameter; 2 meters deep.
Pit no. 2, 3.50 meters in diameter; 2.15 meters deep.
Pit no. 3, 4.50 meters in diameter; 2.00 meters deep.
Pit no. 4, (discovered in 1928–1929; dimensions undetermined).

In association with the dwellings Gorodzov found two work shops containing a very large number of chips, raw material, caches of nuclei and many "intermediate tools," such as hammerstones, anvils, retouchers, etc.

Dating.—Gorodzov is more or less indefinite in setting the time of Timonovka. He feels that the microlithic tendency, decadence and geometrization of some of the forms, coupled with the palaeontological evidence discovered by him, places this culture in the Magdalenian period, in spite of the fact that some of the implements show Aurignacian tendencies in such form as *Châtelperron* blades, *burins busqué*, etc.[1]

19. SUPONEVO

This site is located on the right bank of the Desna River in the village of Suponevo, thirteen kilometers south of Briansk. It was discovered in 1925 when the first excavations were made by Dr. S. S. Deev, curator of the Briansk Museum. Under the river deposits, 25 meters thick, a number of chipped flint implements and bones of animals of the glacial period were unearthed. In 1926 the excavations were continued by P. P. Ephimenko, G. F. Mirchink, B. S. Zhukov, S. S. Deev, Z. G. Grinberg and V. I. Gromov.

The rich cultural contents of this site may be judged by the fact that, according to

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[1] Sawicki, L. ("Materials for the Study of Russian Archaeology," Przeglad Archeologicznii, Vol. III, No. 2, 3, Poznan, 1926–28), overlooking the fact that strong traces of Aurignacian tradition are encountered in undisputedly later stages of the Upper Palaeolithic of Russia, is inclined to date the majority of the sites including Timonovka, as Aurignacian. The comparative study of the material from the Kostenki-Borshevo region with that of the Timonovka-Suponevo area seems to support the opinions of Voevodsky and Gorodzov. (E. G.)

Ephimenko,[1] "from June 21st to July 12th many thousands of flint chips, blades, over one thousand finished implements, a quantity of bone objects, (mammoth tusks and reindeer horn) as well as remains of a very interesting late glacial fauna were obtained."

According to Gromov [2] the bones of the following animals were found:

Elephas primigenius	numerous
Rhinocerous thichorhinus	few
Equus equus	X
Bos sp.	few
Rangifer tarandus	X
Canis lupus	X
Alopes lagopus	numerous
Lepus sp.	X

Ephimenko [3] mentions also Arctic fox, and usual carnivorae.

The investigators are inclined to assign this site to the Magdalenian, but the quality of the flint technique, in the opinion of V. A. Gorodzov,[4] indicates perhaps an earlier period.[5]

In 1927 the excavations were continued by B. S. Zhukov, and in 1928–29 by V. A. Gorodzov. The material obtained is very large. Besides a rich flint industry, objects of bone covered with geometrical designs are reported by Gorodzov.

The whole site awaits detailed publication [6] and previous to that, the precise dating of it would be difficult, although Ephimenko believes that in Suponevo one finds strong traces of the influence of the Magdalenian culture of the Gontzi type, which in his opinion existed quite early and continued for a long time, spreading over a large territory.[7] He mentions [8] the presence of house pits similar to those found in Kostenki I and dates it as early Magdalenian.

20. Elisevichi

Location and History.—This site is located near the village of Elisevichi on the upper right bank of the Sudai River, a tributary of the Desna.

The finds of fossil animal bones were reported from this locality as nearly as 1870, but no investigation of the site was made. The report of the finds of animal bones with flint tools by peasants, who were digging a pit for domestic purposes, attracted the attention of K. M. Polikarpovich [9] who, during the season of 1929–30, was making an archaeological survey of the Desna River region. The investigation revealed that the finds were made on the steep slope, eleven meters above the Sudai River, between two deep gullies, where the spring floods washed out the steep banks. Around a sand pit nearby was found a quantity of patinated flints and fossil bones which prompted further investigation.

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[1] Ephimenko, P. P., "The Expeditions for the Study of Palaeolithic Cultures," Soobchenia of the State Academy for the History of Material Culture (GAIMK), Leningrad, 1926, Vol. I, pp. 319–20.

[2] Gromov, V. I., "The Geology and Fauna of the Palaeolithic Period in U.S.S.R." Problems of Material Culture, 1933, No. 1–2, p. 28.

[3] Ephimenko, P. P., "Pre-Clan Society," Leningrad, 1936, p. 439.

[4] Gorodzov, V. A., "The Results of Archaeological Activities in U.S.S.R. during 1917–30." Manuscript.

[5] Ephimenko, P. P. ("Pre-Clan Society," Leningrad, 1936, p. 438), states that many types characteristic for Kostenki II, III, and IV, are found in Suponevo.

[6] See also Gromov, V., "New Palaeolithic Site," "Priroda," No. 9–10, Leningrad, 1926, p. 65.

[7] Ephimenko, P. P., "Some Results of the Study of Palaeolithic Period in U.S.S.R.," Chelovek, No. 1, 1928, Leningrad, p. 56.

[8] Ephimenko, P. P., "Pre-Clan Society," Leningrad, 1936, p. 291.

[9] Polikarpovich, K. M., "Palaeolithic Sites on the Sudai River," Pratzi of Archaeological Section of Bielorussian Academy of Sciences, Vol. III, Minsk, 1932, 153–166.

Geology.—The trial pit (0.75 by 0.8 meters) made by Polikarpovich showed the following stratigraphy:

1. Humus	1–1.06 cm.
2. Loess	1.06–1.56 cm.
3. Upper interlayer	1.56–1.58 cm.
4. Cultural horizon	1.58–1.66 cm.
5. Lower interlayer	1.66–1.69 cm.
6. Loess	1.69–1.91 cm.

This loess, according to geologists, is of eolian origin and was deposited after the formation of the upper Riss-Würm terrace. The end of the formation of loess preceded the end of the process of accumulation of aluvial deposits on the lower terrace which corresponds to the end of the Bühl stage. This, according to Polikarpovich, definitely dates this loess as belonging to Würm age.

The cultural layer which is some 10 to 12 cm. thick was found in the layer of loess, 1.58 cm. from the surface. It consists of ashes, broken bits of bones, and a number of flint chips and finished tools.

Fauna.

1. *Elephas primigenius.*
2. *Vulpes* (sp.) (*alopex?*).
3. *Canis* (*lupus?*).

Flint Industry.

The majority of implements are made of dark, almost black, or gray flint of chalk origin, partly patinated.

There are five nuclei ranging from 3.4 cm. to 7.4 cm. in length (Fig. 85, nos. 16, 17, 19; four-fifth natural size.)

A large quantity of small chips and flakes was collected. Among these were 74 blades (22 whole and 51 broken). They are all characterized by regularity of form and smallness of size. Of the set of 22 whole ones, 6 are 2.96 cm. by 3.65 cm.; 7 are 4.04 cm. by 4.52 cm.; 9 are 5 cm. by 7.4 cm. (Fig. 85, nos. 9–10). Only three out of the 74 have patination. Some blades (four of the whole ones and seven of the broken ones) have small notches, mostly semi-circular in form (Fig. 85, no. 7). Polikarpovich sees in them special implements for bone and wood work. Some blades (Fig. 85, nos. 12, 14) have a small secondary retouch along the edges and may have served as scrapers. One blade is reminiscent of the type "*à dos rabattu.*" One implement is especially interesting. It is 5.1 by 2.6 cm. (Fig. 85, no. 18) and has no trace of striking platform or bulb of percussion, but shows on one side a semi-circular notch made with side straight blow from top to bottom. Polikarpovich sees a parallel to *pièces esquillees* of Kostenki I and Predmost.

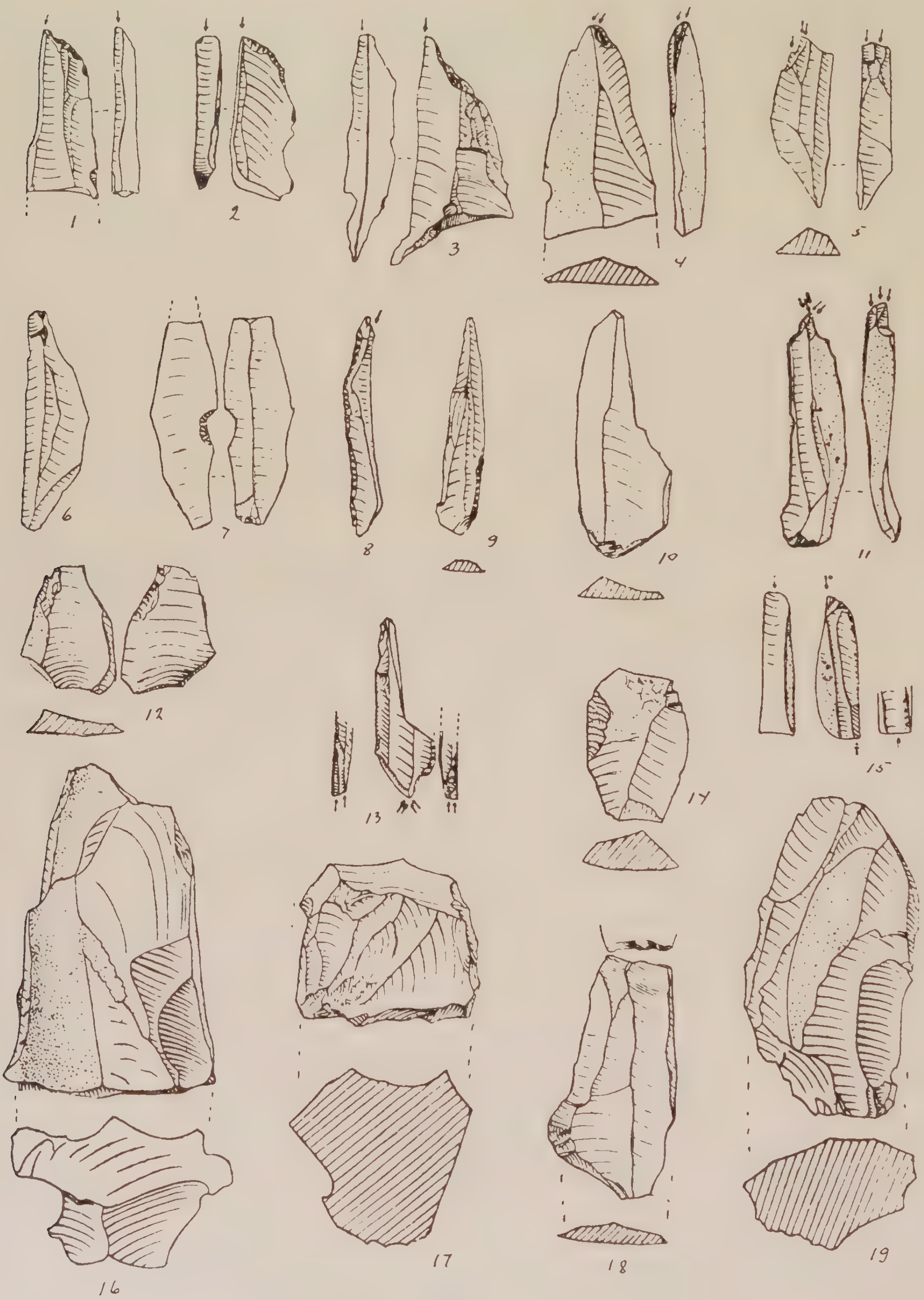
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FIG. 85. Stone Industry of Elisevichi. After L. Polikarpovich.

Gravers constitute the next largest group. There are thirteen of them. Fig. 85 shows:

1 *Burin d'angle and bec de flûte.*
4 *Burin d'angle,* multifacetted.
2 *Burin d'angle,* single.
3 *Burin bec de flûte.*
15 *Burin d'angle* and *bec de flûte.*
5 *Burin,* multifacetted.
11 *Burin,* multifacetted, nucleiform.
13 *Burin,* multifacetted, nucleiform.
8 *Éclat de coup de burin.*

Dating.—On the basis of geological and palaentological evidences[1] as well as the "microlithic" character of the stone industry, with the total absence of large tools, and the general similarity to Timonovka, Suponevo, Mezine and Gontzi, Polikarpovich places Elisevichi in the first part of Magdalenian epoque.

21. ZHURAVKA

Location and History.—The site of Zhuravka is located in the vicinity of the village of Zhuravka, 25 km. from the town of Priluk. It was discovered in 1927 by A. Voronii, who was studying the formation of the terrace of the left bank of the Udai River. The local peasants working at the clay pit northwest of the village in the so called "Zarechiye," 120–125 meters from the entrance of the village from the Priluki-Ladin direction, reported the find of flint chips.

M. Rudinsky and Mme. Muskat arrived at the site at the request of Voronii and established the existence of a cultural layer with bones of fossil animals.

After the preliminary investigation in 1927, this site was thoroughly excavated during the years of 1928 and 1929 by the expedition of the Ukrainian Academy of Sciences under the general direction of M. Rudinsky, in which A. Voronii, V. Krokos, and others participated. Results of their work were published year after year in the Annual reports of the Laboratory of Theodor Vovk.[2] The following resumé is based on these various publications.

Geology.—The village Zhuravka is situated on the left bank of the Udai River, on the typical "one-loess" terrace of the old river valley. This terrace is well pronounced here and offers fine sections for the study which was done by Voronii (*op. cit.*), Krokos (*op. cit.*) and Riznichenko (*op. cit.*).

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[1] Mammoth are absent in the late Magdalenian sites of European Russia. (E. G.)

[2] Rudinsky, M., and Voronii, A., "The Finds in the Village Zhuravka, Priluk County," Anthropologia, Annual Report of the Anthropological Laboratory of T. Vovk for 1927, Kiev, 1928, pp. 65–73.

Rudinsky, M., "The Finds in Zhurava," *Ibid.* for 1928, Kiev, 1929, pp. 140–151.

Krokos, V., "The Conditions of the Palaeolithic Deposit in Zhuravka," *Ibid.*, 1928, Kiev, 1929, p. 135.

Rudinsky, M., "Zhuravka," *Ibid.*, for 1929, Kiev, 1930, pp. 97–122.

Voronii, A., "Materials for the Study of Geology of the Palaeolithic Site of Zhuravka," *Ibid.*, for 1929, Kiev, 1930, pp.123–132.

Riznichenko, V., "The Geological and Geomorphological Conditions of the Palaeolithic Site of Zhuravka," *Ibid.* for 1930, Kiev, 1931, pp. 183–190.

Pidoplichka, J., "Rodents and Carnivorae from Zhuravka," *Ibid.*, for 1929, Kiev, 1930, pp. 133–147.

Field, H., and Prostov, E., "Recent Archaeological Investigations in the Soviet Union," A. A., Vol. 38, No. 2, 1936, p. 277.

The stratigraphy of the site appears to be as follows:

- I. Rough humus.
  - (*a*) Upper layer 0.60 m. } Riznichenko distinguishes four layers here.
  - (*b*) Lower layer 0.60 m. }
- II. Loess—2.60 m.
  - (*a*) Light yellow loess, not stratified, porous, with a number of traces of rodents, and rich in CO_2 (eolian according to Riznichenko), 1.10 m.
  - (*b*) Fine stratified sandy loess quite compact, of dark gray-yellow color with admixture of clay in the lower part, 0.85 m. (river deposit, according to Riznichenko).
  - (*c*) Loess-like loam, very sandy with the thick interlayers of sand. This layer contains the cultural horizon.[1]
- III. A layer of very compact greenish, sandy, coarse loam, 0.30 m.
- IV. Fine stratified sands, 0.60 m.
- V. Greenish loam with a thin layer of sand, 1.00 m.
- VI. Yellow, medium grained sand, 1.00 m.
- VII. Greenish sandy loam.

The cultural remains were found at the approximate depth of 3.80 m. from the surface, right on the top of the layer III, covered by the lower strata of layer II.

Fauna.

Fauna of this site is represented by the following list according to Pidoplichka:

1. *Marmota bobac.*
2. *Citellus rufescens.*
3. *Spalax microphtalmus.*
4. *Citellus* sp.
5. *Cricetus cricetus.*
6. *Microtus arvalis.*
7. *Vermela perugusna.*[2]
8. *Antelope* sp.

The Stone Industry.

The material for the stone industry of Zhuravka was almost exclusively dark gray flint of very good quality and bluish patination, which was evidently imported.

Summarizing the results of the three years of excavation one can say that the most characteristic forms for Zhuravka are backed points and blades with the straight or slightly curved edge and rounded long end. Rudinsky sees here variations from the type of *Châtelperron* (Fig. 86, no. 3) to *La Gravette* (Fig. 88, no. 2) and to the *point à cran atypique* (Fig. 91, no. 1). There is a large number of *lames* and *lamelles à dos rabbatu* or with partial side retouch (Fig. 91). Quite a few examples have either straight or oblique end retouch (Figs. 86, 91). In the "microlithic" series (by which he simply means implements of small size) the most characteristic are the *lamelles à retouche terminale* and *lamelles* and *éclats retouchés* (Figs. 91, 92). Among the other forms a series of *burins* (Figs. 89–91)

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[1] The description of this layer by Voronii differs from the above given on the basis of Rudinsky in as much as, according to the former, this layer is "loess, very clayish and a bit sandy."

[2] *Vermela perugusna* and *Citellus* sp. may be accidental according to Pidoplichka. In general the character of the fauna is that of the steppe, the forest forms being notably absent. Pidoplichka is inclined to believe that the fauna may be of somewhat later character than Aurignacian times, as assigned by Rudinsky.

(*busqué*(?), *à coche*, *d'angle*(?), *bec de flûte*, single and multifacetted of various sizes) and several rather atypical *grattoir carenée* (Fig. 90) and *rabots* (Fig. 90, no. 4) should be mentioned.

The stone implements were not evenly distributed over the excavated area. They had a tendency to be localized in a few spots, one of which seemed to be the remains of a hearth, filled with fragments of charred bone. A lump of reddish matter was found which, according to Rudinsky, proved to be ochre. No bone implements were found.

The illustrations with the explanatory notes of the excavations will give the best idea of the industry.

Fig. 86. 4/5. *Excavation of 1927.*

No. 1. Fragment of blade with vertical retouch and beak-shaped point.
No. 2. Fragment of blade with fine retouch on right side.
No. 3. *Lame de canif.*
Nos. 4–5. Backed blades.
No. 6. Flake with retouch on oblique upper end.
Nos. 7–16. Flakes of various sizes.
Nos. 17–21. *Nuclei*

Fig. 87. 1/1. *Excavation of 1928.*

Nos. 1, 2, 3. Long blades.
No. 4. Triangular blade of Aurignacean type with the round end retouched.
Nos. 5, 7, 9. Long blades.
No. 6. Thick blade with transversal flaking.
No. 8. *Lamelle* from *coup de burin.*
No. 10. A point with the *burin* stroke, on conchoidal end.
No. 11. *Rabot*, nucleiform.
No. 12. *Burin* with trace of vivification.

Fig. 88. 1/1.

No. 1. Backed point.
No. 2. Backed point of *La Gravette* type.
No. 3. Broken backed point.
No. 4. Point in transition to type "*à cran.*"
No. 5. Backed point with end retouched at right angle.
No. 6. Broken backed point.
No. 7. Small flake.
No. 8. Lame with base of graver—*coup de burin* (?) (*Burin*).
No. 9. Polyhedric *burin bec de flûte.*
No. 10. A thin blade.
No. 11. Flake.
No. 12. *Burin en bec de flûte* with simple facet.
No. 13.

Fig. 89. 4/5.

No. 1. *Burin busqué à coche* made on thick end (?).
No. 2. *Burin d'angle à troncature* without retouch.
No. 3. *Burin d'angle à troncature* without retouch.[1]
No. 4. *Burin* on nucleus of *bec de flûte* type.
No. 5. *Burin* triple on rough flake.

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[1] Simple multifacetted burin, as there is no retouch on the end. (E. G.)

No. 6. *Burin polyedrique*—broken.
No. 7. *Burin en bec de flûte atypique* made on flake.
No. 8. *Burin en bec de flûte* atypique made on flake.

Fig. 90. 4/5.

No. 1. *Grattoir carénée.*
No. 2. *Grattoir carénée* fragment.
No. 3. *Éclat transversal de nucleus en d'un rabot revivé.*
No. 4. Nucleus-like scraper (*rabot*).
No. 5. Nucleus-like scraper.

Fig. 91. 1–13, 17 are 4/5; all others 1/1.

No. 1. Large flake with secondary backing retouch.
No. 2. Flake with vertical side retouch, type *La Gravette* (broken).
No. 3. Small *La Gravette* point.
No. 4. *Lame à dos rabattu.*
No. 5. *Lamelle à dos rabattu.*
No. 6. *Lame à dos rabattu.*
No. 7. *Lame à dos rabattu.*
No. 8. *Lamelle à dos rabattu.*
No. 9. *Lamelle* with partial side retouch.
No. 10. Flake with partial side retouch.
No. 11. Double *burin* on end of broken blade.
No. 12. *Lamelle* with the straight end retouched.
No. 13. *Lamelle* with partial side retouch.
No. 14. *Lamelle* with partial side retouch.
No. 15. Fragment of *La Gravette* point.
No. 16. Backed blade (broken).
Nos. 17–21. *Lamelles* and *éclats allongues.*
No. 22. *Burin d'angle à troncature retouche oblique* (?) (Lateral, ? The troncation does not show the retouch. Perhaps a simple *burin* with the side retouched. E. G.)
No. 23. *Éclat au bord droit retouché.*
No. 24. Backed blade, fragment.
No. 25. Backed blade.
Nos. 26–30. *Lamelle* and *éclat allongue.*
No. 31. *Lamelle* with the oblique end retouched.
Nos. 32–34. *Lamelles*, fragments.
No. 35. Triangular *lame à arete ecrasée* (*lame arete dorsal du nucleus*).
No. 36. Flake.
No. 37. Flake.
No. 38. *Burin d'angle sur lame appointée* (*burin bec de flûte* ?).
No. 39. *Lamelle* with partial side retouch.
No. 40. *Burin en bec de flûte.*
No. 41. *Burin.*

Fig. 92. 1/1.

No. 1. *Lamelle* with the straight end retouched and some retouch on both sides.
No. 2. *Lamelle* with the oblique end retouched.
No. 3. *Lamelle* with oblique retouch on both sides forming a point.
No. 4. Fragment of *La Gravette* point.
No. 5. *Lamelle* with partial side retouch.
No. 6. *Lamelle* with the round end retouched.
No. 7. Flake with retouch on both sides.[1]

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[1] Perhaps in this case the retouch on the lower side is due to the reduction of the bulb to make the base thinner. (E. G.)

No. 8. *Lamelle* with the round end retouched.
No. 9. *Lamelle* with partial side retouch.
No. 10. *Lamelle de coup de burin.*
No. 11. *Burin de fortune.*
No. 12. *Lame à dos rabattu.*

Dating.—Discussing the various technical peculiarities of the Zhuravka stone industry, Rudinsky stresses the presence of so many small forms. In fact he quite often uses the term "microlithic," indicating, however, that no true microlithic forms were found. This impression is somewhat weakened if one considers that quite a few of his small forms are but fragments of originally larger pieces, a fact which he does not always recognize. While it is true that the largest specimen is but 7 cm. long, and the largest flake only 9 cm., could it not be simply due to the size of the available (imported) material?

It may be also suggested that *La Gravette* points may be relatively rough in appearance due again to the quality of the material. Rudinsky's assertion of the definite transition from *Châtelperron* (rough forms) to *La Gravette* should not influence the dating. He is evidently unduly influenced by the presence of small tools and goes to great length to prove Aurignacian tendencies as against possible (?) microlithic ones. Still he states that there are two methods of retouch: first, coarser—Aurignacian, and the second—finer, which he calls "microlithic." Here again the limitation of material may be considered.

In conclusion, Rudinsky points out the significance of Zhuravka as another site in the general region of Gontzi (page 367) the industry of which, in his opinion, is quite similar to Zhuravka. He states that it is also quite similar to Borshevo I, and considers it as representing the Upper Aurignacian culture of South Russia.[1]

Quite fortunately somewhat detailed geological researches enable us to consider the temporal dating of the Zhuravka deposit. According to Riznichenko,[2] there are five well-pronounced terraces in the Dnieper region:

1. The contemporary.
2. Sandy terrace of Würm II without loess, and covered by ancient dunes.
3. The terrace of Würm I with one layer of loess, which covers the old alluvial deposits.
4. The terrace of Riss with two horizons of loess over the fluvio-glacial deposits of Riss glaciation.
5. The oldest Mindel terrace with two horizons of loess (the first is divided into two sections) over the moraine of Riss glaciation; the layer of loess under the moraine, and the layer of sands of Mindel-Riss age and fluvio-glacial sands of Mindel glaciation. (The age of Mindel-Riss sands is well documented by the fauna (*Elephas trogontherii*).) The base of this last terrace was formed during Mindel epoch.

According to Riznichenko the terrace in which the Zhuravka finds were discovered is of Würm I, the geological history being reconstructed as follows:

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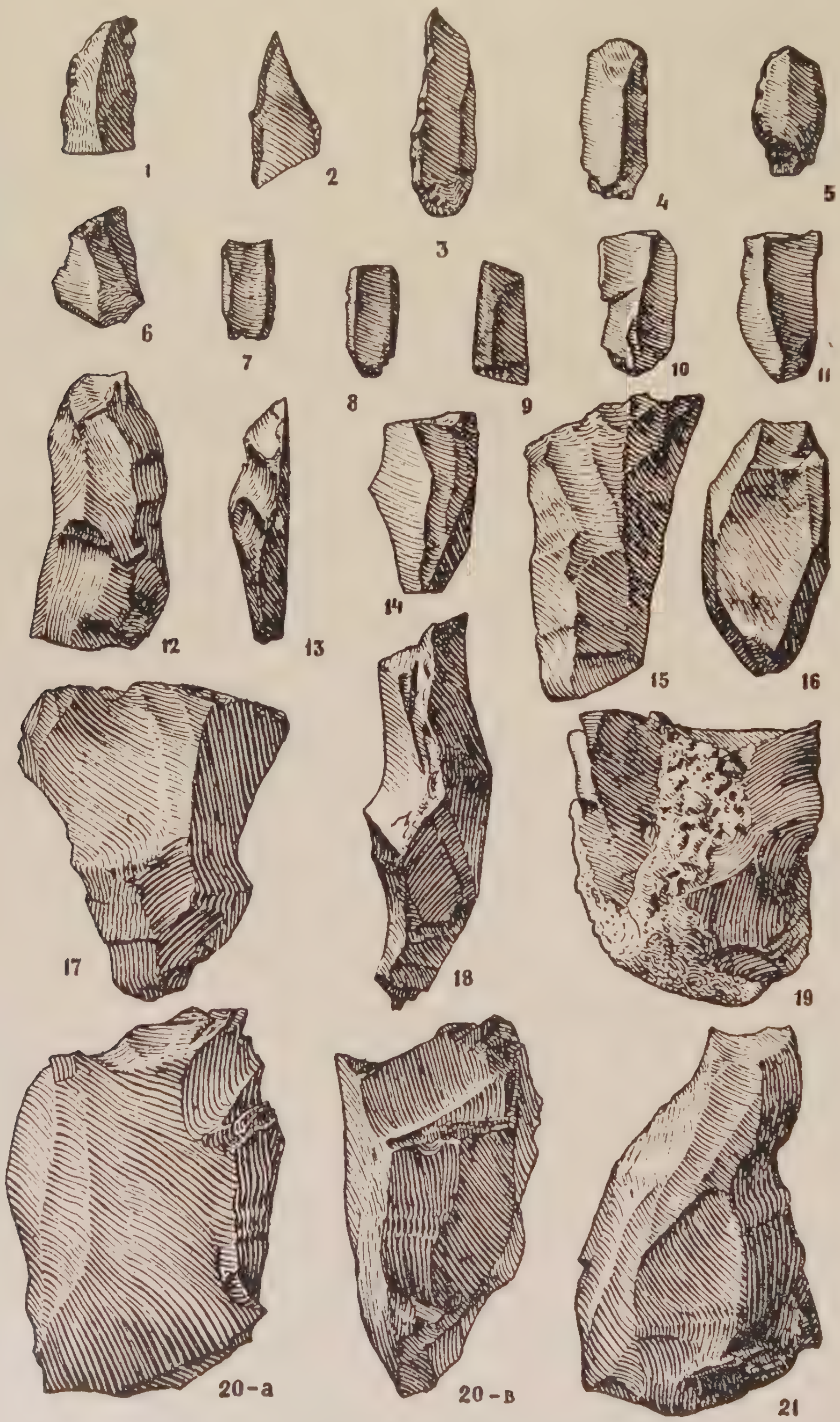
[1] Ephimenko, P. P., ("Pre-Clan Society," Leningrad, 1936) considers Zhuravka contemporaneous with Cyrill Street (p. 386) and Borshevo II. All of these he considers final Magdalenian.

[2] Riznichenko, V., "The Geological Conditions and Geomorphological Conditions of the Palaeolithic site of Zhuravka," Anthropologia, Annual Report of the Laboratory of T. Vovka for 1929, Vol. IV, 1930, pp. 183–190.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20-B
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Fig. 86. Stone Industry of Zhuravka. Excavations of 1927. After M. Rudinsky.

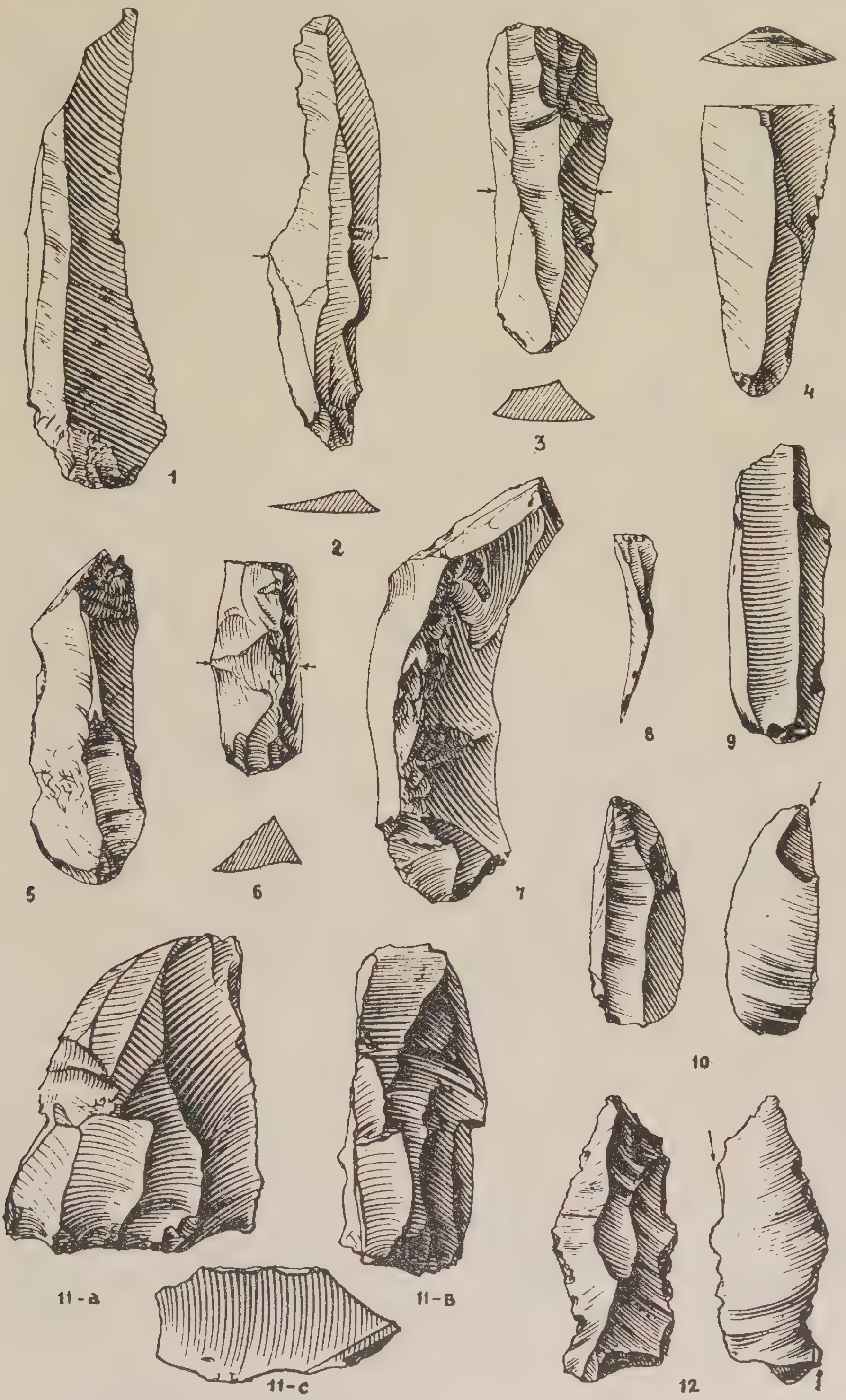
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FIG. 87. Stone Industry of Zhuravka. Excavations of 1928. After M. Rudinsky.

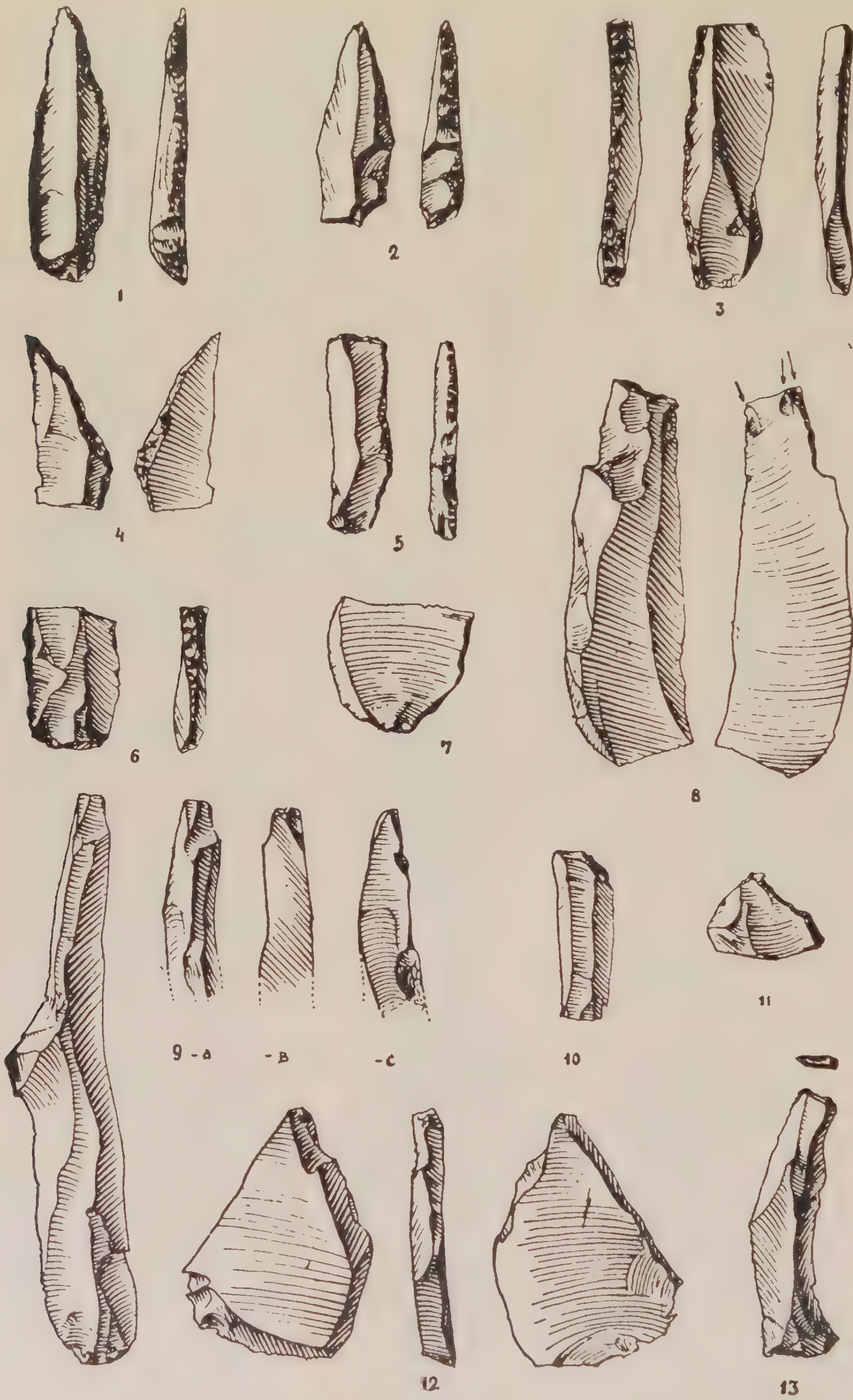
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Fig. 88. Stone Industry of Zhuravka. Excavations of 1928. After M. Rudinsky.

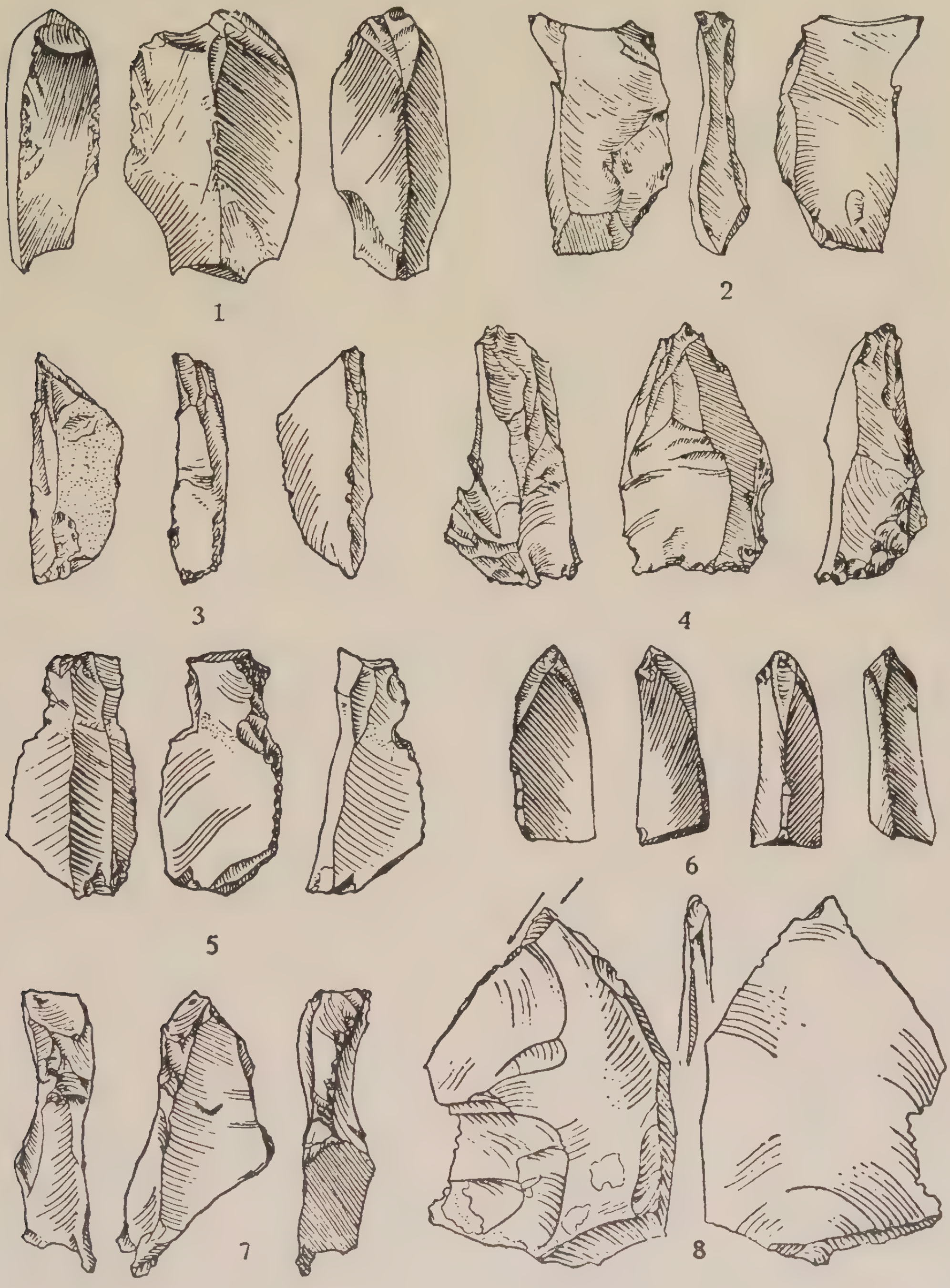

Fig. 89. Stone Industry of Zhuravka. Excavations of 1929. After M. Rudinsky.

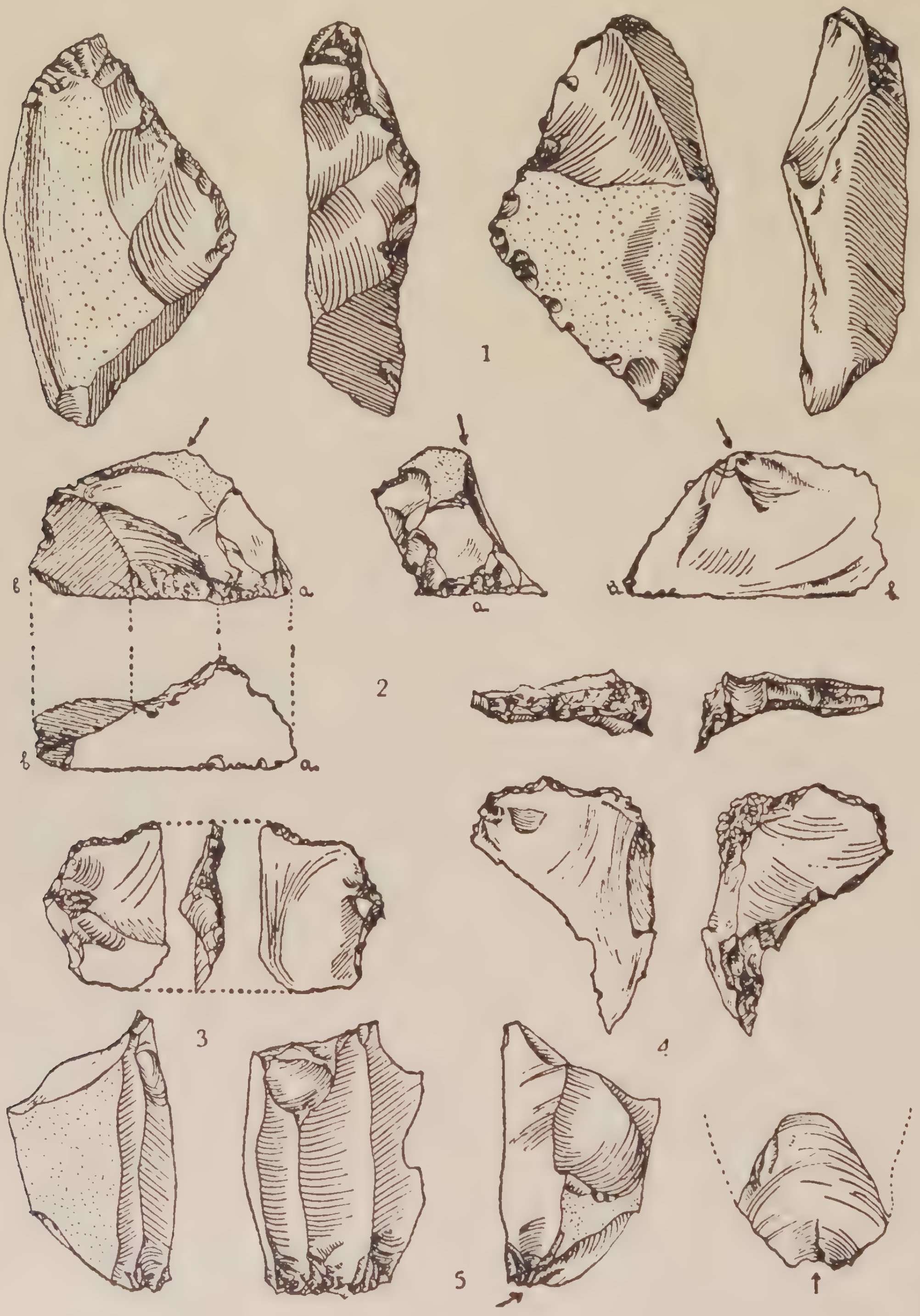
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FIG. 90. Stone Industry of Zhuravka. Excavations of 1929. After M. Rudinsky.

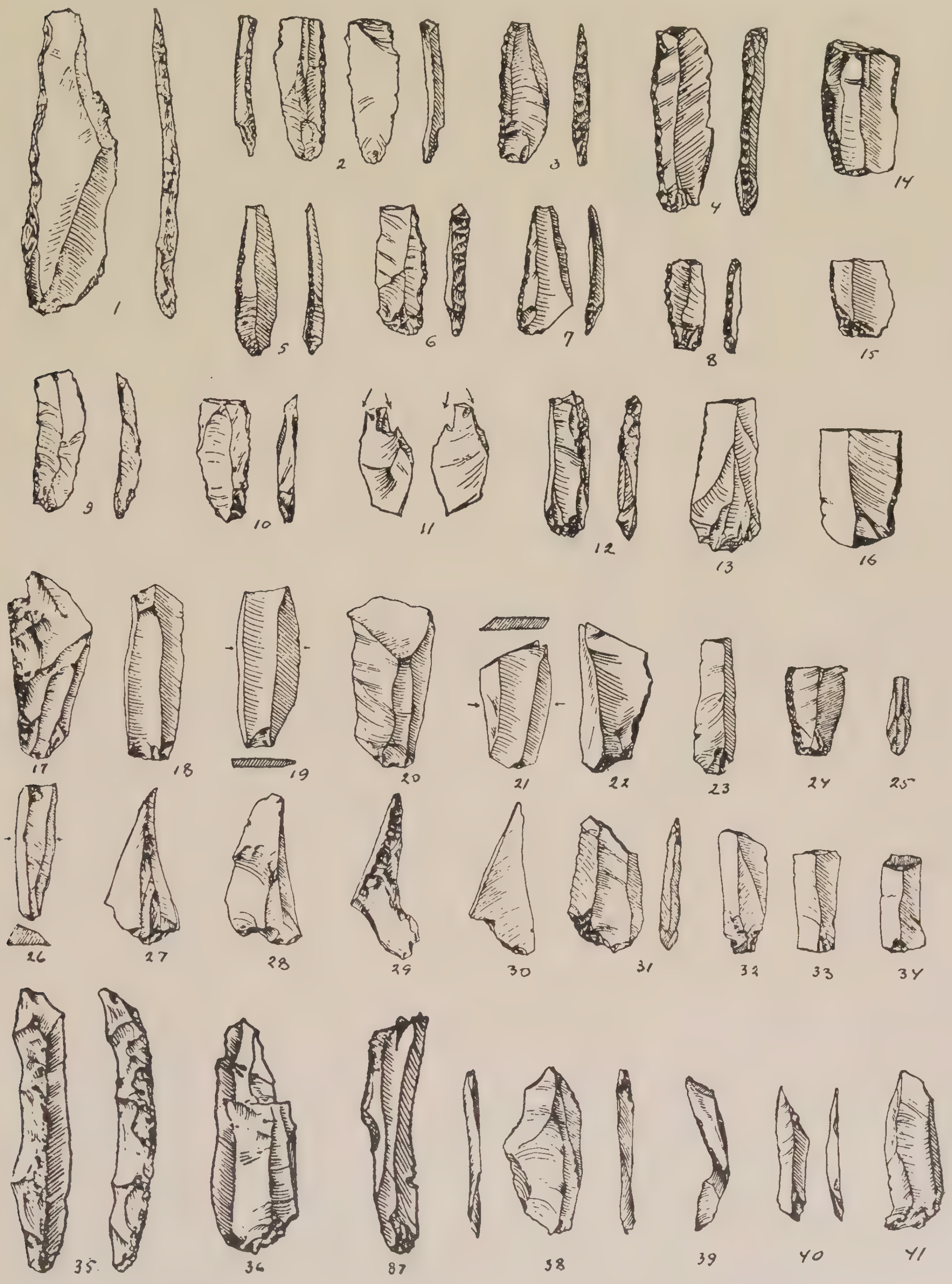
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Fig. 91. Stone Industry of Zhuravka. Excavations of 1929. After M. Rudinsky.

During Würm I, due to great humidity, the abatement of the course of the Udai River was very rapid and resulted in the deposit of a sand layer (IV of the stratigraphy given above). The dry period which followed during the end of Würm I permitted these deposits to emerge, to dry and be covered by the layer of eolian loess (III of the stratigraphy). The process, which continued during the interval between Würm I and Würm II, was accompanied by very dry climate. In the cross-section this layer of eolian loess cannot be observed, being destroyed and partly transformed to the diluvial loess by the water action during the next period of Würm II, which possessed a humid climate. The results of the water action during this period was the deposit of the clay-like layer II and later, more sandy layers in which the cultural horizon is situated.

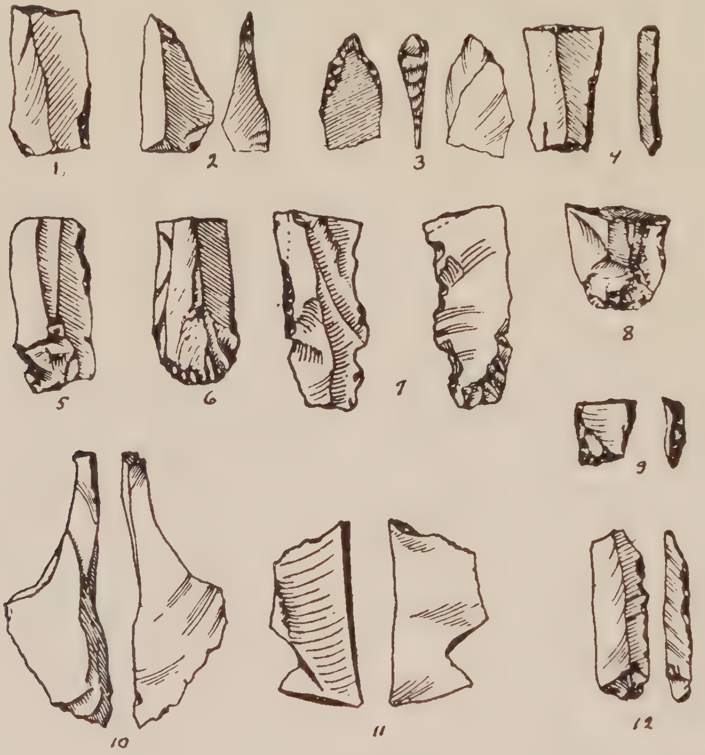

Fig. 92. Stone Industry of Zhuravka. Excavations of 1929. After M. Rudinsky.

During the dry climate of the next part of Würm II the fluvial process ceased and was replaced by the eolian processes which continued for a certain period through Würm II and were the causes of the formation of the eolian loess. The upper part of this formation, the most recent layer of loess of the postglacial deposits indicates more moist conditions, and the process of formation of the soil of the steppes.

In conclusion, Riznichenko states that the Palaeolithic man of Zhuravka inhabited the terrace at the end of the Würmian interval and at the beginning of Würm II. The piece of charcoal identified as *Picea excelsa* proves that during this time the climate was not warm but moist and cold, corresponding to the beginning of the advance of the ice during Würm II.

22. Dubova Gully (Dubova Balka)

Location.—This site is situated on the left shore of the Dnieper River, at the village of Svistunovo-Petrovskoye, near the town of Dniepropetrovsk, on the low terrace of the high slope of the Dubova Gully, 236 meters from the river shore.

History.—It was discovered by T. T. Teslja during the investigations of the left bank of the Dnieper inaugurated by the archaeological expedition for the study of the region of Dnieper's rapids in conjunction with the activities of Dnieprostroi, in July, 1931.

Geology.—The excavations carried by T. T. Teslja [1] and J. Arrachenko disclosed the presence of cultural remains in two distinct geological deposits:

1. In the lower part of the diluvial loess-like sandy "limon" which, according to Riznichenko belongs to the end of Würm Interglacial and to the first part of Würm II.
2. In the upper part of the schistous sands of alluvial origin, the more definite age of which is hard to establish.

Fauna.

According to preliminary investigations made by V. I. Gromov,[2] the remains of the following animals were found:

1. *Bison priscus.*
2. *Equus* sp.
3. *Canis lupus.*
4. *Lepus* sp.
5. Others to be identified.

Cultural Finds.—The excavations uncovered eight distinct cultural horizons, varying in thickness from 10–130 cm., and separated by the interlayers of loess-like sandy "limon" with schistous sands. The uppermost layer No. 1 is 4.51 meters from the surface; layer No. 8 is 7.20 meters from the surface.

Not all of the cultural layers have distinct and characteristic material. Two layers, No. 1 and No. 8, are represented only by remains of fireplaces containing a large quantity of charcoal, and pieces of broken and charred bone, but no flint material. Layer No. 5 produced the richest finds.

The raw material for the stone industry is of various types. The most commonly used is flint of chalk origin. A small number of tools are made of pebbles. The majority of finished tools is made of light brown transparent flint. A number of nuclei, flakes and blades were found.

The leading types of the flint industry are represented by:

1. Points of *La Gravette* type (ten specimens found).
2. *Lames à dos rabbatu.*
3. *Percoirs medians.*
4. Several double end scrapers with steep lameloid retouch.
5. Nucleiform *burin* found together with several transversal flakes belonging to it.
6. Blades with notch, one of them with a notche on both edges, resembling the type of "*lame étrangée.*"

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[1] Teslja, T. T., "Das Palaolith in Bereich der Dnieprostrom-schnellen," Die Quartarperiode, Vol. IV, 1932, Ukranische Academie der Wissenshaften, Kiev, 1932, pp. 83–85.

Field, H., Prostov, Eugene, "Recent Archeological Investigations in Soviet Union," A. A., Vol. 38, No. 2, 1936, p. 277.

[2] Gromov, V. I., "Geology and Fauna of the Palaeolithic Period in U. S. S. R.," Problems of GAIMK, No. 1–2, Leningrad, 1933.

7. *Rabot*-scraper with nine flakes belonging to it, permitting one to determine the manner in which it was made.

A large number of small blades and tiny flakes, ranging from 6 x 5 to 1 x 2 cm., characterizing the technique of flint work, was collected. Often they were found in nests.

Material from other horizons is very similar to layer No. 5, the *La Gravette* point being the characteristic tool.

Bone Industry.

1. Spear points.
2. Awls.
3. Cut tubular bones with fine engraving.
4. Animal teeth with the roots cut off; perhaps objects of adornment.

A number of perforated shells of *Cardium*, *Buccintum* and *Nerita fluviatilis* were found. Some of them were colored red, possibly by ochre. Red, and, to a lesser degree, yellow coloring matter, was found in all layers. Fireplaces were found in all horizons, the small ones usually oval in form. These fireplaces were filled with layers of ashes, pieces of charred wood and bone, fragments of bone, etc. Around the hearth the ground was covered with fragments of bone and flint chips, the quantity of which decreased toward the periphery.

No high bone piles of the type found in Mezine and Gontzi were found here. Teslja considers this as indicative of the fact that fireplaces were built in the open. Their small size denotes the presence of a rather small population. In one layer there were two fireplaces.

Dating.—According to Teslja, the character of the finds indicates that we are dealing in Dubova Gully with nomadic hunters who returned to the site repeatedly, and who were masters of stone technique. On the basis of the development of the stone technique and the presence of certain leading forms, he assigns this culture, in all its horizons, to the Upper Aurignacian.

23. DOVGINICHI (DOLGINICHI)

This site is located ten klm. south of the village of Ovruch, Volyn district. It lies on the Goryn River, on the left slope of the gully which cuts the south slope of Slavechansk-Ovruch plateau. I. F. Levitsky [1] found here, in 1921, the remains of an upper Palaeolithic culture. According to Krokos,[2] his excavations in 1924 and 1928 showed the following stratigraphy: [3]

I. Loam—0 to 270 cm. from the surface.
II. Loess—270 to 1395 cm. from the surface.
III. Cultural layer with animal bones and flint industry.
IV. Loess—1395 to 1650 cm. from the surface.
V. Loam—1650 to 1945 cm. from the surface.

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[1] Levitsky, I. F., "The Palaeolithic Site of Dovginichi," Anthropologia, Annual Report of Laboratory of Th. Vovk (Volkov) for 1929, Kiev, 1930, p. 155.

[2] Krokos, V., "The Stratigraphy of the Upper Palaeolithic Site of Dovginichi in Volyn," Die Quaterperiode. The Ukranian Academy of Science, Vols. 1–2, 1930, Kiev, 1931, pp. 27–35.

[3] The cross-section of Levitsky (Fig. 93) differs slightly from the data of Krokos.

Krokos considers the upper layer of loess as belonging to Würm II, thus placing the layer containing the cultural remains in the Würmian interglacial stage.

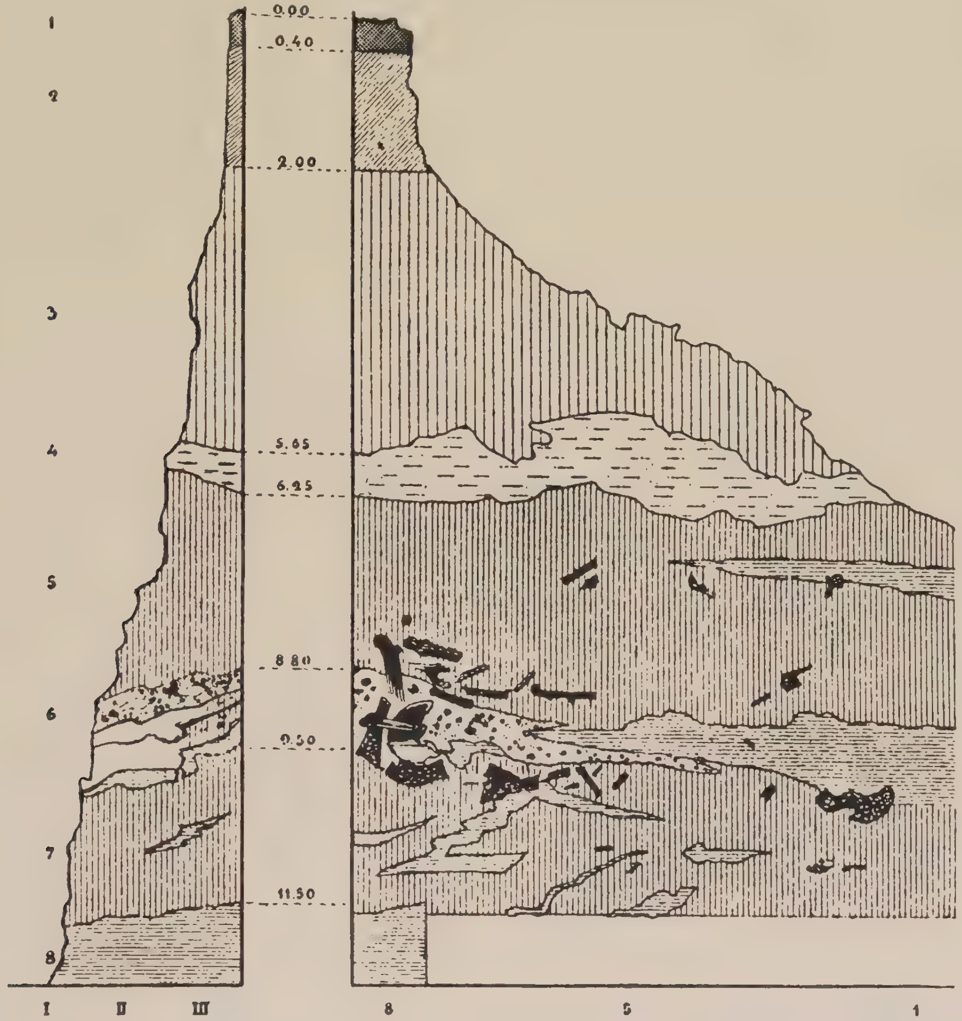

Fig. 93. Cross-section of the Site of Dovginichi. After Levitsky. *1*, humus; *2*, loam; *3*, gray-yellow loess; *4*, gray loess-like strata; *5*, gray-yellow loess with occasional animal remains; *6*, loess-like sandy loam with cultural horizon; *7*, same as layer 5; *8*, blue clayish loam with streaks of loess and washed sands.

Polikarpovitch [1] lists the following fauna: [2]

1. *Elephas primigenius.*
2. *Rhinoceros tichorhinus.*
3. *Rangifer tarandus.*
4. *Equus* sp.
5. *Canis lupus.*

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[1] Polikarpovich, K. M., "The Palaeolithic and Mezolithic Sites of Bielorussia," Pratzi of the Archaeological Section of the Bielorussian Academy of Sciences, Vol. III, Minsk, 1932, pp. 218–221.

[2] Field, H., and Prostov, E. ("Recent Archaeological Investigations in the Soviet Union," A. A., Vol. 38, No. 2, 1936, p. 276), add to the above list *Sus scrofa ferus*, *Citellus suslicus* and identify *Equus* sp. as *Equus-caballus.*

Stone Industry.

Stone artifacts are not numerous. Flint of moraine origin in the vicinity served as material for the tools. It is mostly black, occasionally dark gray, and of very good quality.

Fig. 94, after Levitsky, reproduces the following implements:

1. Nucleiform high scraper, made of dark flint.
2. High scraper.
3. Notched scraper.

4–10. End scrapers in various degrees of finish.

11. Flake with some chipping of the lower face.
12. Fragment of a point with partial retouch on the lower face.
13. Small flake with steep retouch forming a point.
14. Part of the type *Châtelperron*.

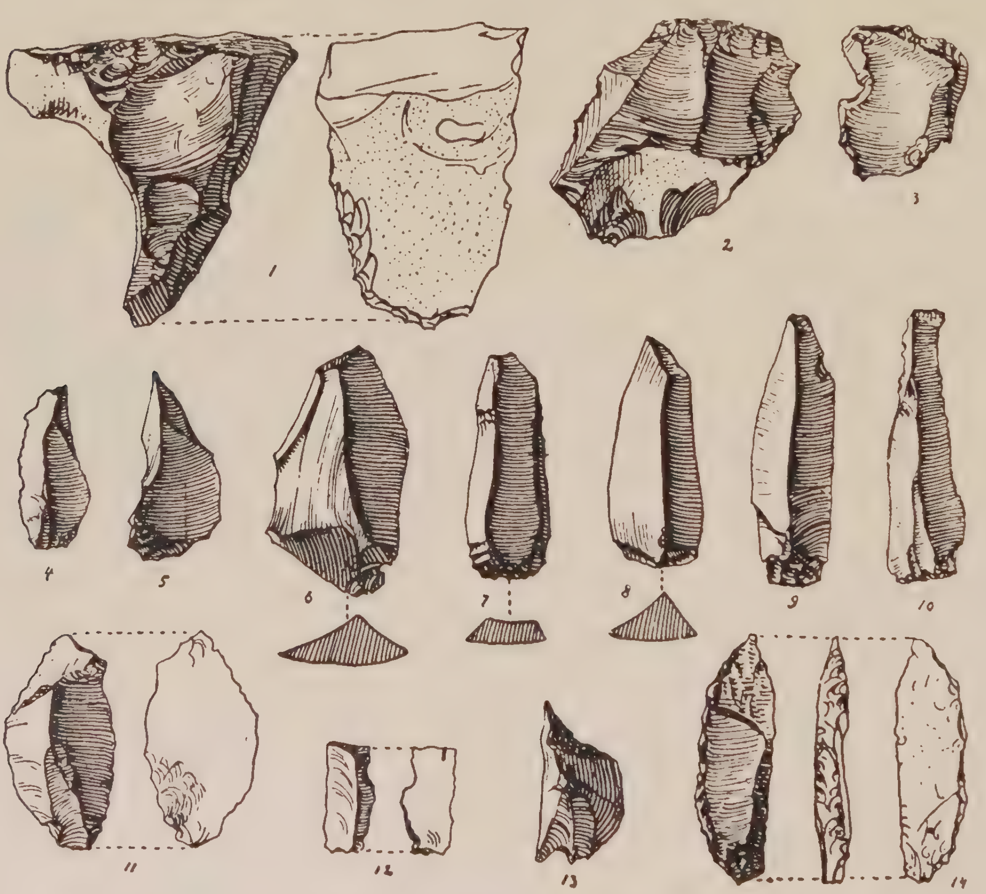

FIG. 94. Stone Industry at Dovginichi. ½ nat. size. After Levitsky.

Dating.—Polikarpovich, stating that the site is rather poor industrially, considers it as belonging to the Upper Palaeolithic, while Levitsky, perhaps on the basis of presence of *Châtelperron,* and point No. 13, which he calls of the type of *point á cran,* calls it Aurignacian. According to H. Field and E. Prostov,[1] "Stratigraphical and paleontological data, combined with a technological study of the industry, ascribe this station to the Upper Aurignacian period."

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[1] *Op. cit.,* p. 276

24. KOSTENKI IV (ALEXANDROVKA)

This site was discovered by S. N. Zamiatnin, during the reconnaissance work of 1927. It is situated in the village of Kostenki, Voronezh region, at the south of the main Alexandrovka gully, almost at its junction with the valley of the Don.

Stratigraphically it is very similar to Borshevo II, which is situated several kilometers lower down the Don.

In its cultural aspect it is also quite similar to Borshevo II. The cultural layer, though rather thin, has a considerable spread. It is strongly and evenly colored, and almost totally lacking in large bones or even fragments. Its industry, however, differs considerably from other sites of this region. "The blades with dulled backs" in many variants, form the largest groups of Kostenki IV tools. Very interesting is the almost total absence of gravers, which are replaced here by a tool, the cutting edge of which is formed by bilateral chipping of the upper end. This form, found in Kostenki II and III, as well as consideration of the stratigraphy, permits the dating of the site [1] as the Aurignacian-Solutrean of Ephimenko.[2]

25. KOSTENKI V

Kostenki V is located in the village of Kostenki, Voronezh region, on the bank of the Don River. In the same locality as Kostenki II (see page 357), but near the mouth of the gully and lower on its slope, trial excavations revealed traces of a hearth older than Kostenki II. The flint implements are represented by:

(*a*) Massive multi-facetted gravers.
(*b*) Laurel-leaf points with retouch on the lower sides, several large blades.

All tools are made of uniform dark flint of calceous origin, very different from the spotted pebble material of which the tools of Kostenki II were made. The investigations were not finished.[3]

26. KASTROVA GULLY

Kastrova Gully is situated on the left shore of the Dnieper River, near the village of Svistunovo-Petrovskoye, on the lower terrace on the steep slope of the deep gully Kastrova. It was discovered in July, 1931, by T. T. Teslja [4] during the investigations of the left bank of the Dnieper initiated by the archeological expedition for the study of the Rapids region of the Dnieper in connection with "Dnieprostroi," [5] and studied by A. Dobrovolsky who found three different cultural deposits in different horizons.[6] The first cultural deposit (upper ?) was found in the middle part of the loess layer, and, according to the investigator, contains rather untypical industrial types of Magdalenian character.

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[1] Zamiatnin, S. N., "Expeditions for the Study of Palaeolithic Cultures in 1927," Soobschenia of the State Academy for the History of Material Culture, Vol. II, p. 211, Leningrad, 1929.

[2] Later ("Pre-Clan Society," Leningrad, 1936, p. 346) Ephimenko dates it as Early Magdalenian.

[3] Zamiatnin, S. N., "Expeditions for the Study of Palaeolithic Cultures in 1927," Soobschenia of the State Academy for the History of Material Culture, Vol. II, Leningrad, 1929.

[4] Teslja, T. T., "Das Palaolith in Bereich der Dnieprostrom-schnellen," Die Quartarperiode, Vol. IV, 1932. Ukrainische Akademie der Wissenschaften, Kiev, 1932.

[5] Dnieper River construction project.

[6] Field, H., and Prostov, E., ("Recent Archaeological Investigations in the Soviet Union," A. A., Vol. 38, No. 2, 1936, p. 275), consider these deposits as four different sites.

The second deposit was represented by a series of horizons in the loess-like "limon" and contained Aurignacian industry.

The third deposit is also in loess-like sandy "limon," but the industry is devoid of leading or identifying forms.

Bone and stone implements were found, and are in the process of being studied.[1]

These deposits are assigned by V. Riznichenko to the Würm interglacial period, or the first half of Würm II.

27. Lugansk

This site is situated on the sandy surface of the flood plain terrace of the Donetz River, near the town of Lugansk.[2]

In 1921, S. A. Loktushev found here bones of the following animals:

1. *Elephas primigenius.*
2. *Rhinoceros tichorhinus.*
3. *Equus caballus.*
4. *Bos priscus.*
5. *Rangifer tarandus.*

According to Gorodzov,[3] flint implements and a very well preserved spearhead were found with the bone remains. The spearhead, made of mammoth bone, 25 cm. long, is characteristically Magdalenian of the Sagai type.[4]

The investigations were continued in 1926, and published by Loktushev. This publication was not available to me.

Dating.—Gorodzov considers the site Magdalenian; Sawicki,[5] Aurignacian.

28. Gvardzhilas-Klde

This cave is situated near the village of Rgan, Shoporan District, Kutais region of Caucasus, in the deep gully of the stream Chirula, which is the right tributary of the Kvirilla River.

The cave faces southeast and lies fifteen meters above the level of the Chirula. It is semi-oval in ground plan, being 30 meters long, 12.5 meters wide at the entrance, and 3–3.5 meters wide (Fig. 95).

Gvardzhilas Klde was investigated by S. Krukovsky[6] in 1910. He found it very much disturbed by the treasure hunting activities of the local population. In one section which, apparently, was not disturbed, he found the following stratigraphy:

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[1] No illustrations of cultural finds are available. (E. G.)

[2] Rudinsky, M., "The Scientific Work on Paleolithic and Mezolithic Culture in Ukraine during the Revolution," Anthropologia, Annual report of the Anthropological Laboratory of T. Volkov, 1930, Kiev, 1931.

[3] Gorodzov, V., "Archeological Excavations and Investigations in Soviet Russia from 1919–1923," "Drevnii Mir," Part I, Moscow, 1924, p. 2.

[4] According to Field, H., and Prostov, E., ("Recent Archeological Investigations in the Soviet Union," A. A., Vol. 38, No. 2, 1936, p. 36), the fauna list does not include the mammoth. This report further states that S. Loktushev, V. Gorodzov and L. Sawicki attribute this site to the Aurignacian period.

[5] Sawicki, L., "Materials for the Study of Russian Archaeology," Przeglad Archeologicznii, Vol. III, No. 2, 3, Poznan, 1926–28.

[6] Krukovsky, S., "The Cave of Gvardzhilas Klde in Rgan," Bulletin of the Caucasian Museum, Vol. X, Nov., 1916, Tiflis, pp. 1–7.

1. Humus covering the limestone debris, with modern potsherds, iron objects, etc.
2. Layer of calcite breccia, with a few fragments of bones.
3. A dry layer of marl containing a few fragments of bones, and, at the lower part, flint chips.
4. First cultural layer, located in a dark dry stratum, with limestone debris. Many broken bones and flint implements were found here.
5. A layer of limestone material which fell from the ceiling.
6. Second cultural layer, of dark color due to the presence of charcoal, which was found in larger pieces. It contained broken animal bones and numerous flint implements.
7. Same as layer 5, but much thicker.
8. Bottom of the cave.

Gromov cites the following fauna:[1]

Cervus elaphus.
Gulo gulo.
Ursus arctos.
Ursus spelaeus (?).

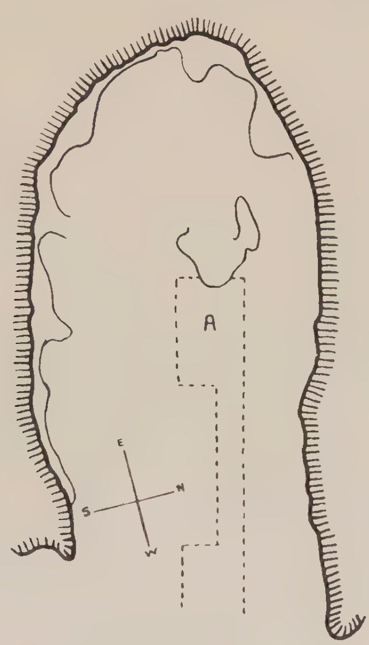

Fig. 95. Cave of Gvardzhilas-Klde. Ground plan, 1 : 200. *A*, excavation of Krukovsky. After S. Krukovsky.

Dating.—Ephimenko[2] states that the bulk of the stone industry consists of small blades, retouched on the back, and the microlithic triangular points, typical for the late Capsian, in which he sees the first geometrical microliths. Of interest also are small, roughly chipped handaxes, which are found here and there in western Europe, in Azilian and Tardenoisian sites. A few simple tools of bone, and a harpoon of Azilian type,[1] concludes the list. On the basis of the industry, Ephimenko dates Gvardzhilas-Klde as Azilian,[2] while Gorodzov [3] considers it Magdalenian.

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[1] Gromov, V. I., "Geology and Fauna of the Palaeolithic Period in U. S. S. R.," Problems of the History of Material Culture, No. 1–2, Leningrad, 1933, pp. 23–33.

[2] Ephimenko, P. P., "Pre-Clan Society," Leningrad, 1936, p. 493.

29. Koukrek

The rock shelter of Koukrek is situated 3 kl. south of the cave Kiik-Koba (see pages 240–257) some 20 km. from Siempheropol, Crimea. There is a cultural layer 1–1.5 meters from the surface under the structure of clay and coarse gravel of diluvial origin.

Above, at the depth of 0.6 meters is a second layer with several typical Tardenoisian trapezoids. Due unquestionably to unusually bad conditions for preservation, no charred wood or bone fragments were found.

Gromov [4] lists the following fauna, evidently for the lower horizon:

1. *Sus scrofa.*
2. *Cervus elaphus.*
3. *Canis lupus.*
4. *Canis familiaris.*
5. *Vulpes vulpes.*
6. *Vulpes corsac.*
7. *Meles meles.*
8. *Martes foina.*
9. *Felis lynx.*
10. *Felis silvestris.*
11. *Lepus europeus.*
12. *Citellus rufescens.*
13. *Cricetus cricetus.*

According to Bonch-Osmolovsky,[5] Koukrek industry occupies an intermediate place between Suren II (see page 394) and Tardenoisian, approaching the first by the presence of *burins* and by the Solutrean-like retouch on the lower side of blades, and to the second by the perfection of the blades and the presence of *grattoirs arrondis* and of *lames à encoches*. The geometrical forms are absent. Instead, only obliquely pointed, small blades with lateral retouch exist.

Koukrek is very much like Kizil-Koba (see page 433) but represents, apparently, an earlier stage than Tardenoisian.

30. Kolodiazhnoe

This site is located near the village of Kolodiazhnoe, Miropol district, Volyn region, on the right bank of the Sluch River, where it is joined by its tributary Tuihterevka.

In 1924, the attention of I. Levitsky [6] and Gamchenko, who were excavating neolithic deposits in the vicinity, was attracted by the find of several objects from the different horizons in the near-by stone quarry.

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[1] Unfortunately no illustrations of stone and bone industry are available to the author. (E. G.)

[2] Ephimenko, P. P., "Some Results of the Study of the Palaeolithic Period in U. S. S. R.," "Chelovek," No. 1, 1928, Leningrad, p. 57.

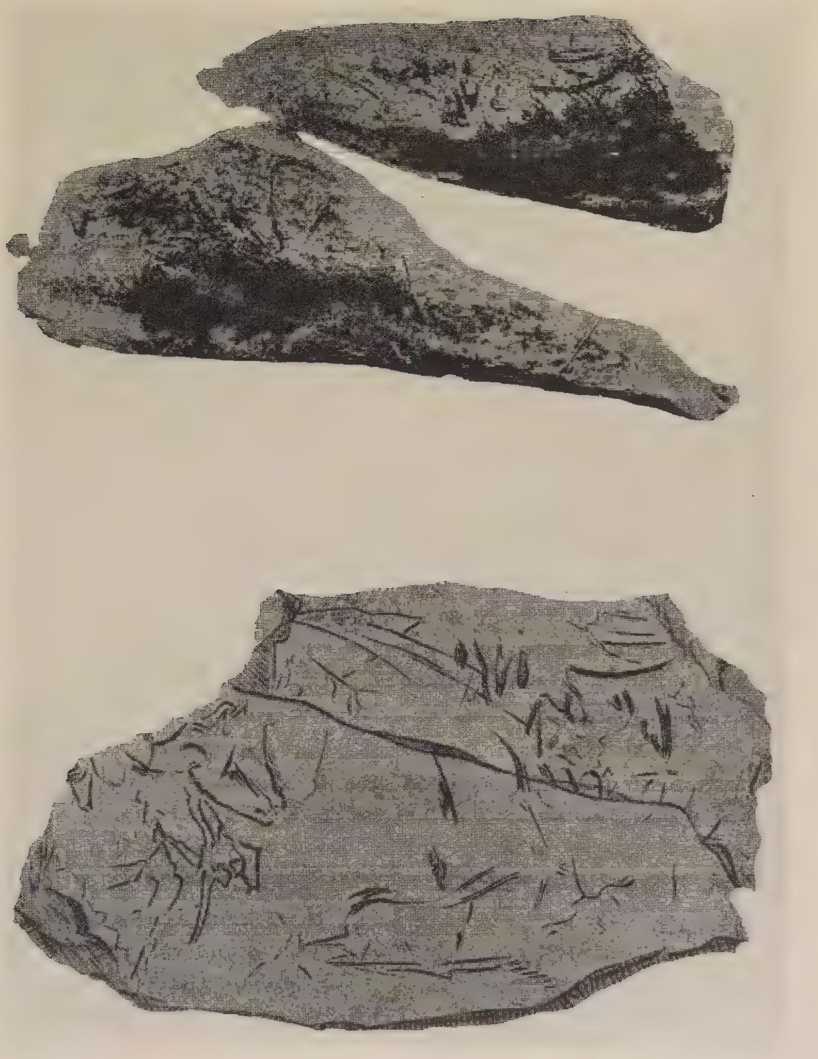
[3] Gorodzov, V. A., "New Archaeological Discoveries in Soviet Russia," Manuscript, 1931.

[4] Gromov, V. I., "Geology and Fauna of the Palaeolithic Period in U. S. S. R.," Problems of the History of Material Culture, No. 1–2, Leningrad, 1933.

[5] Bonch-Osmolovsky, G. A., "Le Paléolithique de Crimée," Bulletin of the Quaternary Committee, No. 1, 1929.

[6] Levitsky, I., "The Finds of Kolodiazhnoe," Bulletin of the Anthropological Laboratory of Th. Volkov, Vol. I, Kiev, 1925, pp. 35–39.

PLATE XXXVII



Engraved Reindeer Bone from Kolodiazhnoe. After I. Levitsky.

The finds consisted of:

(*a*) Animal bone with both ends "sawed off."
(*b*) Teeth of fossil horse.
(*c*) Fragment of long bone with traces of engraving (Plate XXXVII).

In 1926, S. Gamchenko found the remains of mammoth and horse bones under the thick layer (9 inches?) [1] of loess, in the strata of sand with nests of greenish clay (27 mm.). No further finds were made.

Levitsky distinguishes on the engraved bone

(*a*) The head of a deer (41 x 28 mm.) on the left side of the illustration.
(*b*) A human head (23 x 17.5 mm.) on the right side of the bone.

The present author is inclined to question the Palaeolithic age of this find especially on the basis of the second design, the execution of which is unparalleled in that age, and the technique of which is too modern.

31. Postnikov Gully

This site is situated on the northern outskirts of the town of Samara, three and one-half km. from the Samara-Voskresenskii Spusk, (see page 437), in the corner formed by the bank of the Volga and the Postnikov Gully. According to V. A. Gorodzov,[2] it was discovered in 1924 by M. G. Matkin, and in 1925 investigated by Mme. V. V. Golmsten and P. P. Ephimenko.

V. V. Golmsten [3] reports that "The cultural layer containing the remains lay in loess-like clay. A small trial excavation revealed here a 'hearth' and a number of objects: a fragment of bone needle, a piece of shell disk, flint points retouched on both sides, scrapers of high form, perforators, gravers with oblique edge, etc. Among the bones, remains of the mammoth were found."

The following objects are reproduced here from illustrations given by Golmsten (Fig. 96):

1. Bone needle.
2. Shell disk.
3. Object of stone (?).
4. Fragment of stone point.
5. Fragment of stone point.
6. Fragment of stone point.
7. *Grattoir carenée.*
8. End scraper.
9. End scraper.
10. Small nuclei-form tool.
11. Small nuclei-form tool.

[1] Field, H., and Prostov, E., ("Recent Archeological Investigations in the Soviet Union," A. A., Vol. 38, No. 2, 1936, p. 276), indicate "nine *meters* of deposit which yielded worked bone objects attributed to the Upper Palaeolithic period."

[2] Gorodzov, V. A., "The Results of Archaeological Activities in U.S.S.R. during 1917–30." MSS.

[3] Golmsten, V. V., "The Archaeological Remains at Samara Province," Russian Association of the Institutes of Social Science Research, Vol. IV, 1928, pp. 125–129.

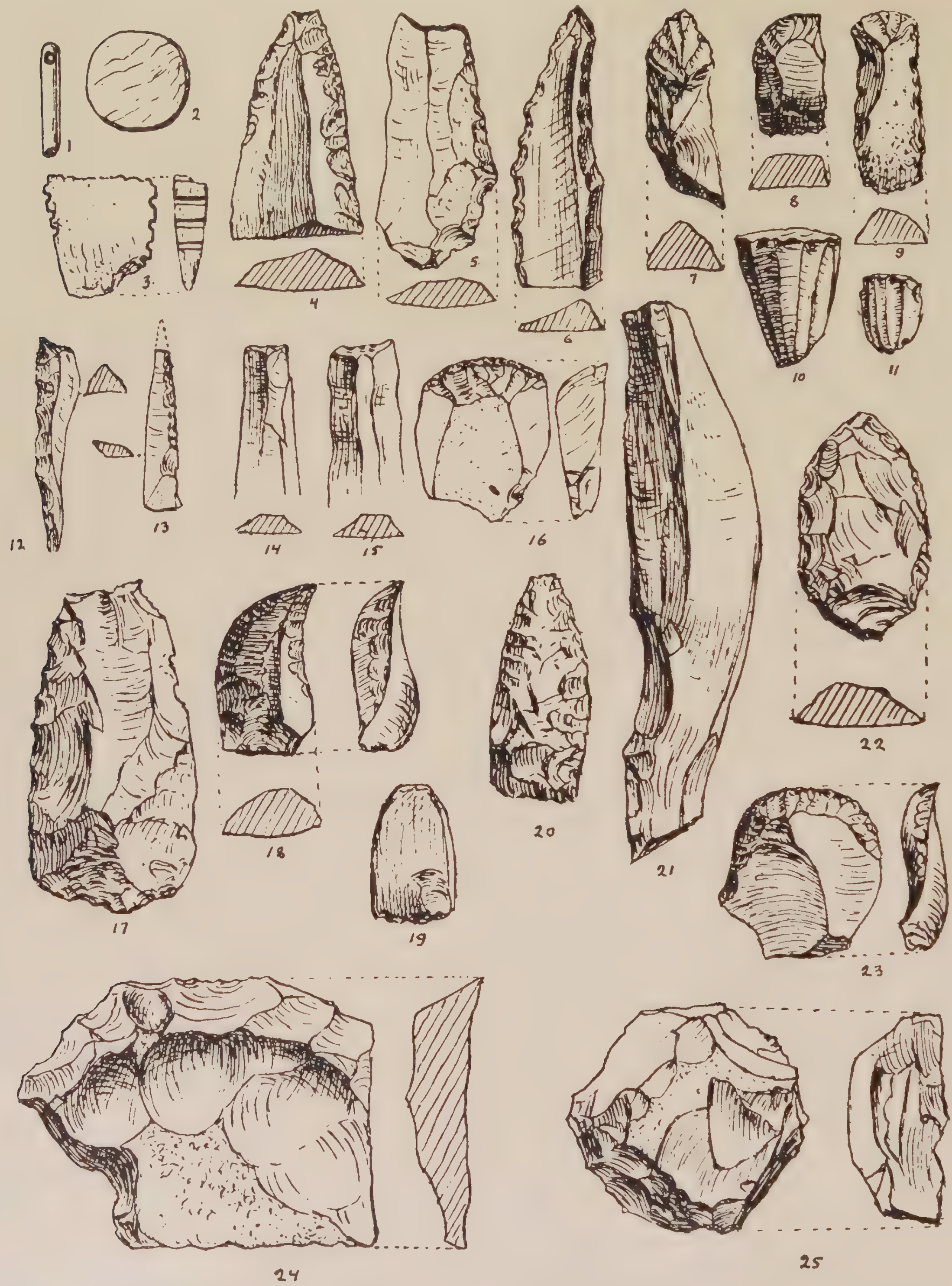

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FIG. 96. Stone and Bone Industry from Postnikov Gully. After Golmsten.

12. Flint chip, retouched on one side.
13. Narrow point of *La Gravette* type.
14. *Burin d'angle* (?).
15. *Burin d'angle* (?).
16. Small scraper with round retouch.
17. Stone tool of hand-axe type.
18. Fragment of point with curved edge, two-third natural size.
19. Flake (?).
20. Finely retouched point, one-half natural size.
21. Long, rough flake with notch, two-third natural size.
22. Point retouched on one side (?), one-half-natural size.
23. Scraper on wide flake with fine circular retouch, two-third natural size.
24. Round scraper on thin flake, one-half natural size.
25. Round scraper on thick flake, one-half natural size.

V. A. Gorodzov, who made further excavations in 1929, states [1] that the cultural layer was at a depth of 2.48 meters in the first (flood-plain) terrace of Volga. The site was largely destroyed by the river.

According to him, the fauna of the site is represented by the mammoth, smaller animals, and fish. The flint industry is not described by him in any detail. He points out that tools are of small size, that gravers are rare, and that there are examples of the end scraper (*encoche*) made of a narrow knife-like blade, which in his opinion is identical with the "encoche" of Bateni (Siberia). He mentions also objects of bone and shell without further describing them, and assigns the date of the site to the Late Magdelenian.

P. P. Ephimenko, who upon the invitation of V. V. Golmsten and the Samara Archaeological Society joined the former in 1926 in check-up investigations, states [2] that his excavations showed, "that in spite of the archaic character of the flints, both (?) horizons of this site belong to the early Neolithic." It seems that he discovered two horizons:

(*a*) The lower with a very primitive microlithic industry
(*b*) The upper (younger) with a characteristic macrolithic industry.

Without explaining this, he states that the Postnikov Gully marks the eastern border of the distribution of the Early Neolithic in South Russia.

Thus we have two different opinions and at present it is impossible to decide in favor of one or the other. It seems strange that Gorodzov, who worked later, in 1929, agrees in general with Golmsten, and that neither of them mention the "macrolithic" and the two horizons of this site.[3]

32. KHERGULIS-KLDE

The cave of Khergulis-Klde is situated near the village of Vachevi, Chiaturi region, Caucasus (Fig. 20, no. 7).

It was first investigated by Krukovsky in 1918; later Zamiatnin [4] made a detailed study of Caucasian Palaeolithic cultures and examined the collection made by Krukovsky in the Museum of Georgia, Tiflis.

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[1] Gorodzov, V. A., "The Results of Archaeological Activities in U.S.S.R. during 1917–30," MSS.

[2] Ephimenko, P. P., "Expeditions for the Study of Palaeolithic Cultures," Soobschenia of the State Academy for the History of Material Culture, Vol. I, p. 319, Leningrad, 1929.

[3] In my opinion the industry, judging by illustrations, does not warrant the Palaeolithic dating of the site. (E. G.)

[4] Field, H., and Prostov, E., "Recent Archaeological Investigations in the Soviet Union," A. A., Vol. 38, No. 2, 1936, pp. 262–263.

The industry includes "characteristic Upper Palaeolithic implements with a large percentage of Late Mousterian forms, prepared from broad triangular flakes, sharp-pointed instruments, and scrapers distinguished for their perfection of retouch."

The illustrations available (Fig. 97) seem to represent:

1. End scraper made on biface.
2. Side scraper make on broad triangular flake, one end forming a point.
3. Crude side scraper made of long flat pebble (?).
4. Oval scraper on thick blade, with retouch on three-fourths of periphery.
5. Graver of *bec de flûte* type.

6, 7. Notched end scrapers.

8. Multi-facetted *burin.*

9, 10, 11. Small backed blades triangular in cross-section, with parallel sides.

Dating.—Zamiatnin considers this site early Upper Palaeolithic.

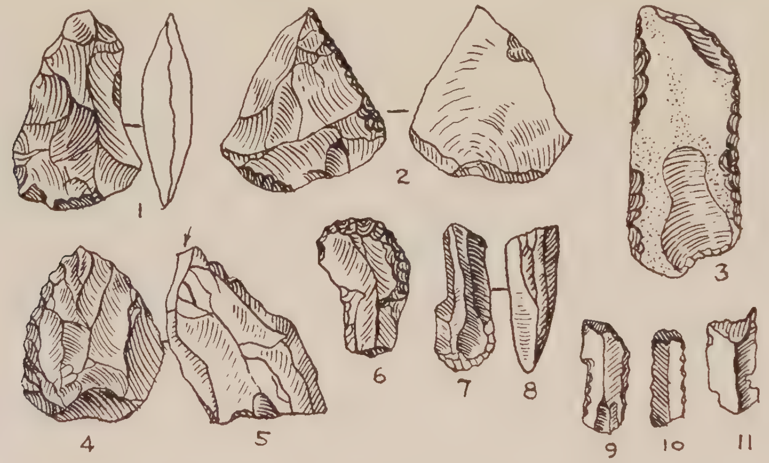

FIG. 97. Flint Industry of Khergulis-Klde. After Field and Prostov.

33. TARO-KLDE

The cave of Taro-Klde is situated near the village of Shukruti, Chiaturi region, Caucasus (Fig. 20, no. 7).

It was investigated by Krukovsky in 1918, and material obtained was studied later by S. N. Zamiatnin.

Like Khergulis-Klde, it yielded "characteristic Upper Palaeolithic implements, as well as a large percentage of Late Mousterian forms."

Field and Prostov[1] reproduce, after Zamiatnin, the stone and bone industry given below (Fig. 98).

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[1] Field, H., and Prostov, E., "Recent Archaeological Investigations in the Soviet Union," A. A., Vol. 38, No. 2, 1936, pp. 262-263.

Judging from illustrations we have the following forms represented:

1. Small *biface*, with additional chipping along the edges.
2. Point of Mousterian type made on thick triangular flake. Both edges retouched.
3. Multi-facetted *burin bec de flûte*.
4. Double end scraper on triangular blade.
5. Double end scraper (*Grattoir mouseau* ?).
6. End scraper made on thick flake; the upper part preserves the original surface of the pebble.

7–8. Nuclei-form *burin*.

9–10. Backed blades.

11. Point made on thick long blade, triangular in cross-section, edges bear fine retouch.

12–13. Bone points.

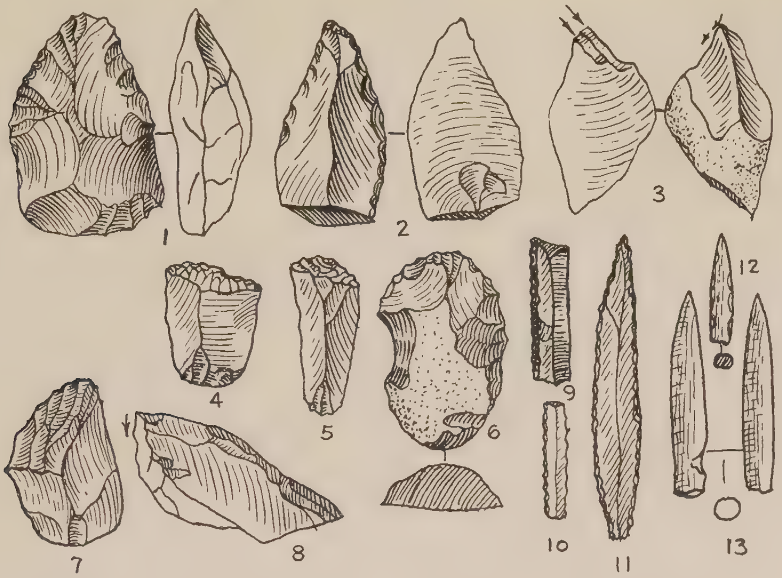

Fig. 98. Flint and Bone Industry of Taro-Klde. After Field and Prostov.

34. Studenitza

Location.—This site is located near the village of Studenitza, Ushitzk district, Podol region. Two large gullies join the bank of the river Dniester, to form a valley in which the village is situated.[1] The river flows one hundred and forty feet below the top of the hills. The shore is divided by these gullies into three separate mountains, Gorshkovataya, Ganusisko, and Bielaya, which surround the valley on three sides.

On the top of Bielaya mountain, as well as on the floor of the caves situated on the river slope, were found, according to Antonovitch, "several dozens chipped flint implements, knives, points, scrapers, nuclei and axes (?). The tools were roughly worked by large facets and improved by secondary retouch along the edges."[1] Antonovitch surveyed five caves. Cave No. 4 is fifteen meters deep, the chambers of cave No. 5 are seven, ten and twelve meters deep. According to Spitzin, the floor of the caves is covered by debris falling from the ceiling and has a cultural layer, perhaps of palaeolithic times.

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[1] Spitzin, A. A., "The Russian Palaeolithic Period," Zapiski of the Imperial Archaeological Society, Slavic Division, Vol. XI, Petrograd, 1915, pp. 140–143.

In 1904, Studenitza was investigated by Professor Krishtaphovich.[2] He gives the following cross-section of the shore here, beginning from the bottom.

(*a*) Whitish-gray clay with fresh water molluscs—12 feet.
(*b*) Loess with terrestrial molluscs with streaks of gravel and conglomerate, the lower part of which contains fresh water molluscs. The thickness of the conglomerate is about seven feet, but towards the head of the gully the loess increases to 28–30 feet, and contains as many as five and six horizons of conglomerate.
(*c*) Diluvial loam and humus.

In the loess of the region of the Bielaya and the Ganusisko Mts. were found many animal bones, mostly those of mammoth, often purposely broken, together with flint implements. Similar tools were found on the flat top of Bielaya mountain. Krishtaphovich states that Studenitza culture was contemporaneous with the deposition of loesses, but his short description of the latter does not give any material for dating the separate horizons. No description is given of the small quantity of flint tools, part of which were found in the caves.

Henry Field and Eugene Prostov[3] list Studenitza among several sites excavated in 1927–28, revealing Aurignacian industry and fragments of bones of small animals, belonging to the final phase of the Quaternary period in Eastern Europe.

Ephimenko,[4] however, dates it as Early Magdalenian on the basis of the industry, which, according to him, is identical with Kostenki III and Karacharavo. Thus, 80 per cent. of all finds are gravers, with the predominance of rough gravers made on thick flakes, reminiscent of the primitive Aurignacian types. Considerably fewer in number are the usual end scrapers as well as perforators and other tools.

35. CHERKESS-KERMEN

In the same general area as Suren I and II, Merezhkovsky found traces of human habitation in the two caves of Cherkess-Kermen.

The industry, according to Bonch-Osmolovsky,[5] had a microlithic character. In the small collection preserved in the Anthropological Department of the Museum of Anthropology and Ethnography in Leningrad, there is one specimen of trapezoid form, but the large size and rudeness of chipping makes it a prototype of Microlithic industry.

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[1] Antonovitch, V., "About Rock Caves on the Bank of the Dniester River in Podol Province," Trudi of the Odessa Archaeological Congress, Vol. 1, pp. 93–95.

[2] Krishtaphovich, N. I., "Geological Investigation of the Palaeolithic Sites during the Summer of 1904," Drevnosti, Trudi of the Moscow Archaeological Society, Vol. XXI, Part II, pp. 178–181.

[3] Field, H., and Prostov, E., "Recent Archaeological Investigations in the Soviet Union," A. A., Vol. 38, No. 2, p. 276.

[4] Ephimenko, P. P., "Pre-Clan Society," Leningrad, 1936, p. 346.

[5] Bonch-Osmolovsky, G. A., "Prehistoric Cultures of Crimea," Krim, No. 2.

According to Ephimenko,[1] we have here the following forms: small scrapers, small oblique points, typical geometric microlithics in the form of a rough trapezoid, or double oblique points.

The blades have very regular sides, unlike those of earlier cultures. On the basis of the general character of the industry and the fact that gravers are very rare here, Ephimenko dates this site as late Azilian.

36. Novo-Alexandria

The site of Novo-Alexandria is located near the town of the same name, in the vicinity of the village of Gora-Pulavskaya on the left bank of the river Visla. The discovery was made by N. I. Krishtaphovich in 1894.[2]

The river Visla runs northward, cutting a deep valley in the chalk plateau south of Novo-Alexandria. In its southern part, the bank is high, steep, and rocky. The river deposits are absent, having been washed away by the river, but where they are preserved, they appear in the form of well-pronounced terraces.

The investigator distinguishes three kinds of terraces:

(*a*) Basic (ancient).
(*b*) Ancient, diluvial.
(*c*) New, alluvial.

The remains of a palaeolithic site were discovered in the deposits of the second diluvial terrace which adjoins the basic terrace and is forty-two feet above the river surface. Its surface is even; only in spots is it furrowed by the gullies.

A very good natural cross-section can be observed on the left bank of the valley above the village of Gora-Pulavskaya, where a number of bones of fossil animals were collected which are now preserved in the Museum of Novo-Alexandria.

We have here the following picture:

1. The surface layer of humus—10–12 inches.
2. Quartzite or sometimes clayish sands, alternatly fine and coarse—10 feet.
3. A layer of glacial boulders which lay at the base of the sand layer; here and there the boulders are displaced by gravel.
4. Loess-like loam. Its upper part is sandy, the lower part more clayish, gradually changing into the dark gray, almost black clay, of the next layer. The whole layer, especially the upper part, contains an admixture of partly decayed roots, stems of plants, bits of shell, and parts of mammal bones. It is twelve to fourteen feet thick.
5. A dark gray, almost black clay containing in spots many shells of terrestrial molluscs (*Pupa muscorum, Lucena oblonga, Limnophysa truncutula, Helix,* etc.), the remains of plants and trees, and bones of birds and mammals. Thin steaks of debris of local chalks, sandstone, and pebbles of northern crystalline formations, are observed in this layer. The total thickness of it is 2 or 2.5 m.

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[1] Ephimenko, P. P., "Some Results of the Study of Palaeolithic Period in U.S.S.R.," Leningrad, 1928, "Chelovek," No. 1, p. 58.

[2] Krishtaphovich, N. I., "Post-Tertiary Formations in the Vicinity of Novo-Alexandria," Warsaw, 1896, pp. 47–69. Also, "The Old Palaeolithic Sites on the Territory of European Russia and Their Geologic Age," Trudi of the 10th Congress of Russian Naturalists, 1898, 1902.

In one of the lowest horizons of the last layer were found remains of a Palaeolithic site:

(*a*) Flint implements of various types.

(*b*) Broken bones of—

Elephas primigenius.	*Bos priscus.*
Rhinoceros tichorhinus.	*Sus scrofa, fossilis.*
Equus caballus, fossilis.	

All this was mixed with charcoal and was imbedded in the clay in irregular layers. The bones were numerous, but very much broken and split. The fact that light pieces of charcoal were found together with heavy stones, indicates, according to A. A. Spitzin,[1] that the material was found *in situ.*

Krishtaphovich, according to Spitzin, believes that the gray clay was formed during the interglacial period, as it lies over the stratum of pebbles. He thinks that at the end of this period the layers of lake and other water type of schistous loesses were formed.

He further maintains that the character of this formation, together with the absence of any traces of water action on any of the objects, so different in weight, indicates definitely that the objects became imbedded in the clay at a time when it was not covered by water. Considering the topography of the clay layer and its relation to the location of the finds, it is highly probable that during the period of habitation this clay was temporarily above water, forming the shore of the basin. This supposition is confirmed by the numerous remains of terrestrial molluscs and plants found in this layer.

In the horizon of the ancient diluvial terrace described above, special attention should be paid to the presence of the remains of two glacial moraines, the oldest of which is characterized by the debris of local formations and northern crystalline boulders. It forms the foundation of all post-tertiary formations of the Visla valley and, therefore, is older than the terrace itself and the remains of the palaeolithic station found there. The remains of the second and later moraine (layer No. 3) were deposited above the cultural clay level and represent a later phenomenon.

Ascribing the remains of the moraines to the last glaciations (Third Riss and Fourth Würm) formerly covering Poland, Gorodzov agrees with the geologist-investigator in considering the age of this site as belonging to the Riss-Würm Interglacial period.

Unfortunately, the writer has no available material for judging the nature of the flint industry outside of a very sketchy description given by Gorodzov[2] and Spitzin. The original work by Krishtaphovich could not be obtained.

"The flint industry," writes Spitzin, "is characterized by a predominance of chips and flakes indicating that the tools were manufactured on the spot. There are knives of rather careless technique, sometimes combined with scrapers; and many needle-like thin splinters which have hardly been used. Only several knives bear a secondary retouch."

According to Krishtaphovich this industry is analogous to the lower layer of the Oitzov cave.

Gorodzov, who is inclined to stress geological conditions for purposes of dating, feels that in this case there is sufficient basis for dating this site as Middle-Aurignacian. He

[1] Spitzin, A. A., "The Russian Palaeolithic Period," Zapiski of the Imperial Russian Archaeological Society, Slavic Division, Petrograd, 1915, Vol. XI, p. 139.

[2] Gorodzov, V. I., "Archaeology, The Stone Age," Moscow, 1925, Vol. I, pp. 191–192.

believes that the collected flint material confirms his conclusions. The pressure flaking technique and the presence of both large and microlithic forms, point to the existence of a culture corresponding to that of the Middle-Aurignacian. He finds that the tools are similar to those from the Polish cave finds of earlier date, but that their general character shows that this culture is different from contemporary cultures of Western Europe.

This difference is especially manifest in the absence or perhaps scarcity of retouching by the counter-stroke technique, which is widely distributed and characteristic of the West-European cultures of the "early period." [1]

37. Kizil-Koba

This site is located on one of the Yayla mountains, Crimea, near the village of Kizil-Koba, on the Alma River. It was discovered by K. S. Merezhkovsky [1] in 1879–80. Later, it was visited by S. A. Zabnin, N. L. Ernest and G. A. Bonch-Osmolovsky who made further excavations.

Geology.—According to Merezhkovsky,[2] the cultural remains were found under the humus on the top of the hills, and along the slope of the gully in the layer of dark gray clay.

Flint Industry.

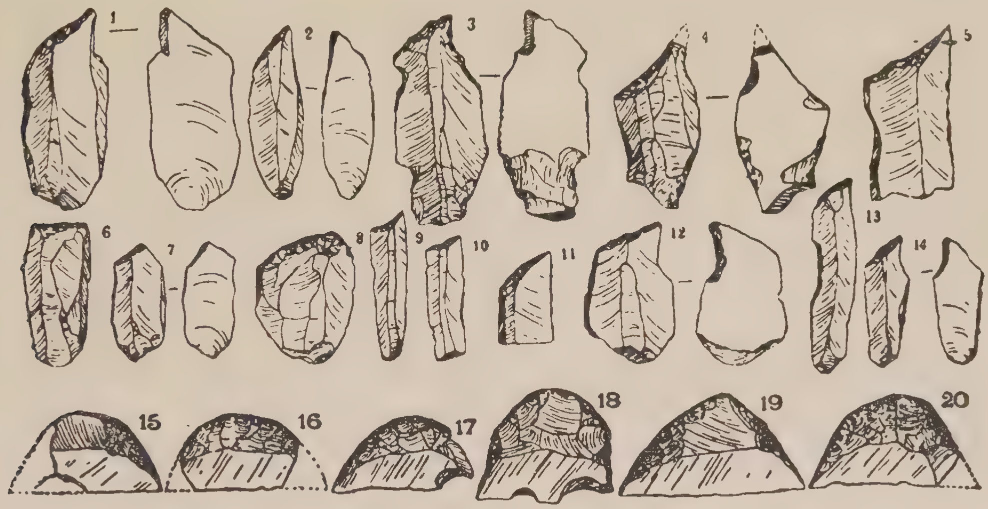

Fig. 99. Stone Industry of Kizil-Koba. After Ephimenko.

According to Ephimenko,[3] we are dealing with a workshop. There is a mass of nuclei, chips, flakes, unfinished and finished tools. Over 10,000 flakes and chips, as well as approximately 1,000 tools, were found. The tools are made of fine brown flint of different shades.

Nuclei.—The nuclei are conical and prismoidal in form, and number several thousand. They may be divided into two groups:

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[1] Gorodzov, V. I., "Archaeology, The Stone Age," Moscow, 1925, Vol. I, p. 192.

[2] Merezhkovsky, K. S., "The Report of the Preliminary Investigations of the Stone Age in Crimea," Izvestia of Imperial Russian Geographical Society, 1880, Vol. 2, pp. 106–176.

[3] Ephimenko, P. P., "Small Flint Implements of Geometrical and Other Peculiar Forms in Russian Sites of Early Neolithic Age," Russian Anthropological Journal, Vol. 13, Part 3–4, pp. 211–228.

1. The larger, 5–6 cm. long, served to prepare the usual microlithic implements.
2. The miniature nuclei, out of which only the smaller points were made.

Scrapers.—The scrapers are of various forms but mostly round, discoidal, semi-cylindrical, and made on the end of a blade (Fig. 99, nos. 8, 15–20).

Burins.—The burins are of *d'angle* type (Fig. 99, nos. 1, 2, 3).

Blades.—Blades are retouched obliquely, forming more or less sharp points (Fig. 99, nos. 5, 9, 11).

As a whole the industry is characterized by the presence of peculiar microliths of geometrical forms, together with Upper Palaeolithic tools such as gravers and scrapers. The small size of the tools, which average from 1.5–4 cm., together with the almost mathematical regularity of the forms of trapezoids, triangles, and segments, as well as the fineness of the finish, is extraordinary. P. P. Ephimenko considers it as belonging to an earlier part of the Microlithic epoch than the other Crimean finds.

38. Iskorost

Location and History.—In 1911 V. V. Khvoiko discovered a Palaeolithic station near the village of Iskorost, Ovruchev County, Volyn Province Palaeolithic implements were found in the earth which formed the portion of two mounds above the ground, which led to the continuation of the excavations below the surface of the ground.

According to Grushevsky, as quoted by Spitzin:[1] "At a depth of 0.5 m. in a layer of undisturbed ground flint chips and tools varying in shape and size were found. Further, in the same layer, at a depth of 0.8 m. were found several hearths, 2.5–5 m. in diameter, somewhat apart from each other. They consisted of a layer of ashes and charcoal, under which was an area of burned red soil. All of them were surrounded over a considerable area by horizontal layers of cultural deposits, formed by decayed organic matter, mostly food remains, a large quantity of different flint tools, and flint pebbles of various sizes. The material was *in situ*, above a horizontal layer of diluvial origin." The largest part of the site was covered by a mound. The excavation revealed a series of separate hearths of different sizes, distinguished by spots of ashes, charcoal, burned earth, and layers of cultural deposits with decayed animal bones. The hearths were surrounded by an unusually large quantity of flint tools, gravers of special form and size, spear points, knives, scrapers, and also some tools of unusual form.

Spitzin writes further: "As this site was situated in one horizon and consisted of complex hearths, it is evident that it belongs to one time and one family or clan. The fact that it was located far from the water is inexplicable. As the hearths are small and the bone remains insignificant, it is doubtful whether it served as a place of long habitation.[2]

On the basis of the large number of chips and the small quantity of finished tools, Spitzin concludes that this was a workshop. We cannot explain the even distribution of large chips of flint around the hearths, and he suggests that a clear space would have been preserved here and there for lying and sitting.

The collection brought by Khvoiko to the Imperial Archaeological Committee consists of a considerable number of nuclei, knives, chips, and a few scrapers.

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[1] Spitzin, A. A., "The Russian Palaeolithic Period," Zapiski of the Imperial Russian Archaeological Society, Slavic Division, Vol. XI, Petrograd, 1915, pp. 142–144.

[2] *Ibid.*

According to Vishnevsky,[1] "The high degree of workmanship of stone tools indicates a high cultural development."

This site requires further investigation.[2]

39. Osokorovka

This site is located on the left shore of the Dnieper, near the village of Svistunovo-Petrovskoye, on the lower terrace, near the Osokorovka River. The site was discovered in July, 1931, by T. T. Teslja,[3] and studied by I. Levitsky.

Several cultural horizons were found. The lowest one is in the loess and, according to investigators, contains Aurignacian industry. The horizon above it is in the "limon," which is in turn covered by the layers of loess. This upper horizon is Magdalenian. Over it are the layers deposited in interglacial intervals and containing the Epipalaeolithic industry.[4]

The remains of hearths and habitations are of especial interest. No further details are available as the material is being studied and prepared for publication.[5]

40. Meltinova

This site is situated on the bank of the Donetz river, near the village of Meltinova, Belevsk district, Tula region.[6] It was partly investigated by V. A. Gorodzov.[7] A cross-section of the ground at the site presents the following picture:

1. Gray-yellow loess-like clay of recent origin—3 feet.
2. Gray clay with remains of vegetation—0.75 feet.
3. Gray clay with short streaks of coarse washed sand, especially abundant in the lower part, with many remains of vegetable matter and shells—3.5 feet.
4. Thin layer of yellow clay with spots of ochre—0.25 feet.
5. Bright yellow clay—3 feet.
6. Limestone.

The yellow clay is of a Quaternary age. The flint chips and bones of fossil animals were found in the third layer and are attributed tentatively to the post-glacial period. Further details are not available.

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[1] Vishnevsky, "Prehistoric Man in Russia," Appendix to the translation of Osborn's "Men of the Old Stone Age," Leningrad, 1934, p. 465.

[2] Skutil, J., ("Ossarynce und Iskorost, zwei palaeolitische stationen in Osteeuropa," Eiszeit und Urgeschichte, Vol. IV, part 5, 1928, pp. 46–48) gives additional information.

[3] Teslja, T. T., "Das Paläolith im Bereich der Dnieprostrom-schnellen," Die Quartarperiode, part 4, Ukrainische Akademie der Wissenschaffen, Kiev, 1932, pp. 83–85.

[4] According to V. V. Riznichenko, quoted by Teslja, the lower horizons are in the loess layer of Würm I, the middle horizon in the deposits of Würm Interglacial, and the upper horizons in the post-glacial formations.

[5] It should be noted that H. Field and E. Prostov (op. cit. A. A. Vol. 38, p. 276) refer, presumably, to the same site as Osokorovka II in the body of the article, and as Osokorovka in the list of sites. The description, however, so tallies with the above in all details, as to permit the author to assume the Roman II after the name of the site to be a typographical error.

[6] Spitzin, A. A., "The Russian Palaeolithic Period," Zapiski of the Imperial Russian Archaeological Society, Slavic Division, Vol. XI, Petrograd, 1915.

[7] Gorodzov, V. A., "Materials for the Archaeological Map of the Valley and Shores of the Oka River," Trudi of the XII Archaeological Congress, Vol. I, p. 540.

41. URKUSTA

During the excavation of the Tardenoisian burial in two grottos of Urkusta, in the valley of Baidar, Crimea, G. A. Bonch-Osmolovsky [1] discovered the remains of a Palaeolithic site with several cultural layers, containing a flint industry, objects of bone, and fossil remains.

According to the investigator, the cultural contents of these layers differ considerably. Thus, in the lower layer, was found a number of gravers and scrapers made on short blades, as well as a quantity of geometrical forms rather thick in cross-section. The blades here appear to be quite massive.

In the upper layers the blades are thinner and more regular, becoming almost typically Tardenoisian in style. The gravers disappear; the scrapers are made only on round flakes. Here backed blades and blades with lateral notch appear in large numbers, while the geometrical forms are like the fine trapezoides of the Tardenoisian.

No further information is available to the author.

42. STENINA

According to Spitzin,[2] a palaeolithic site was discovered in 1900 near the village of Stenina, Kozelsk district, Kaluga Region. On the bank of the Torstenka Creek several split mammoth bones were found in association with charcoal. The trial excavations produced a considerable quantity of bones, flint tools, and small bone points. The small excavations made in 1902 produced bones of elk and bison and about twenty implements (scrapers and knives) made of bone, horn, flint, and limestone. In the same year Krishtaphovich visited this site and found that the layer containing bones and bone tools was of lake-river origin, and that part of the objects were *in situ*, while part had been moved about within the borders of the same lake depression. The bones of the mammoth, reindeer, and *Bos primigenius*, were identified.[3] This site is especially interesting because of its bone work, which may belong to another period. Spitzin does not venture to give any dating.

43. KACHINSK

Kachinsk rock shelter, situated in the southern part of the Crimean peninsula, was discovered by K. S. Merezhkovsky. According to Bonch-Osmolovsky,[4] the cultural layer contained flint industry of earlier character than that of Suren II (see page 394). However, the presence of scrapers made on the end of a blade suggests a relation to Magdalenian culture.

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[1] Bonch-Osmolovsky, G. A., "Le Palèolitique de Crimèe," Bulletin of the Quaternary Committee, No. 1, 1929, p. 32.

[2] Spitzin, A. A., "The Russian Palaeolithic Period," Zapiski of the Imperial Russian Archaeological Society, Slavic Division, Vol. XI, Petrograd, 1915.

[3] Chetirkin, I., "The Discovery in Kozelsk County near the Village of Stenina of Remains of the Palaeolithic Period," Izvestia of Kaluga Archaeological Committee, 1902, pp. 2–5.

Krishtaphovich, N. I., "Geological Investigation of the Palaeolithic Site during the Summer of 1904," Drevnosti, Trudi of the Moscow Archaeological Society, Vol. XXI, part 2, p. 176.

Krishtaphovich, N. I., "The Location of Mammoth Bones in Kozelsk County," Year Book of Russian Geology, Vol. IV, part 1, pp. 173–176.

[4] Bonch-Osmolovsky, G. A., "The Prehistoric Cultures of Crimea," Krim, No. 2.

The bones of a ten-year-old child were found in the same layer in association with the flint implements. The materials await further study.

44. Chatirzhdag

A culture similar to that of Suren I was discovered by K. S. Merezhkovsky[1] in the cave of Chatirzhdag (Binbash-Koba and Sula Koba) in Crimea. No materials are preserved and therefore dating is impossible.

45. Sergeyevka

The site of Sergeyevka, is located in the Gadatsky district of the Poltava region. In 1921 a local teacher discovered bones of mammoth and flint flakes in a deep gully of the Gadatsky district. This site was visited by V. Scherbakovsky,[2] but not investigated.

46. Khotianovka

This site is situated on the bank of the Desna River in the village of Khotianovka, 15 klm. southwest of Trubchevsk, Briansk region. It was discovered by the representatives of the Academy of Sciences of U.S.S.R. in 1929,[3] who made the preliminary investigations.

The materials obtained are now preserved in the Geological Museum of the Academy of Sciences in Leningrad. They consist of mammoth bones and a small number of flint chips. Of special interest is the rib of a mammoth covered with a design in the form of deep notches rhythmically arranged in two rows. One end of the rib is broken. The function of this tool is difficult to determine. The results of investigations are as yet unpublished.

47. Voskresenskii Spusk

This site is almost opposite the town of Samara at the base of the first (flood-plain) terrace on the left bank of the Volga River.[4] The discovery was made in 1926, when sewers were laid at a depth of 3.15 meters. According to Golmsten,[5] attention was attracted by the mammoth tusk found at a depth of 3 m. Next to it were found flint chips and artificially broken bones.

The first investigator was the Samara archaeologist, M. G. Matkin, who placed in the Samara Archaeological Museum the material collected in the sewer trench. The more detailed investigation of V. A. Gorodzov in 1929 resulted in finds of the bones of the mammoth, Siberian rhinoceros, and a large species of *Bos*, a fauna which points to a considerable antiquity for this site. No further details pertaining to the industry are available to the author.

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[1] Bonch-Osmolovsky, G. A., "The Prehistoric Cultures in Crimea," Krim, No. 1.

[2] Scherbakovsky, V., An article in Zbornik of the Local Ukrainian Scientific Society in Kiev, Kiev, 1921, p. 153.

Scherbakovsky, V., "Bemerkungen über neue wenig-bekannte Palaolithische Stationen in der Ukraine," Eiszeit IV, 1927.

Rudinsky, M., "The Scientific Work on Paleolithic and Mesolithic Cultures in Ukraine during the Revolution," Anthropologia, Annual Report of the Anthropological Laboratory of T. Vovk for 1930, Kiev, 1931, p. 148.

[3] Gorodzov, V. A., "The Results of Archaeological Activities in U.S.S.R. during 1917–1930," MSS.

[4] Gorodzov, V. A., "The Results of Archaeological Activities in U.S.S.R. during 1917–1930," MSS.; also "Diary of Archaeological Excavations in Samara in 1929," MSS.

[5] Golmsten, V. V., "Archaeological Remains of Samara Province," RANION, Vol. IX, 1928, p. 129.

48. Kamenetzk-Podolsk

Very little is known about this site, which is near Kamenetzk-Podolsks, Podol region, beyond the fact that according to Uvarov and others [1] during dam construction, 2.5 km. from the Dniester River bones of a mammoth were found, which were later brought to Kiev University. A student of V. B. Antonovitch who reported this find to Uvarov, unfortunately arrived on the spot of the find after most of the loess layer had been removed. In the remaining loess, besides the mammoth tusk and several long bones, were found two flint scrapers. No further investigations were made.

49. Protasov Yar

According to Krishtaphovich,[2] mammoth bones and small flint tools with traces of a hearth were discovered in 1903 near the railway station in Kiev, in the so-called Protasov Yar (Protasov Gully).

The cultural remains were in the layer of sand, underlain by the glauconite clays at the depth of 56 feet below the surface. The geological conditions are said to be identical with those at the site of Cyrill Street (see pages 386–393). The series of layers of gray sands and loesses cover the cultural horizon. No illustrations of industry or further details are available to the author.

50. Viazovka

Spitzin,[3] quoting Kaminsky,[4] indicates that in the gully in the village of Viazovka, near the town of Luben, Poltava Province, a flint tool of Mousterian type was found, in association with a fragment of mammoth jaw.

51. Shapovalovka

This site is located near the village of Shapovalovka, Koroton District, Chernigov region, in the basin of the river Seim. On the slope of the lake shore bones of a mammoth and flint knives [5] were found in 1879 at a depth of three and a half feet.

Further investigations were made there in 1929 and, according to Rudinsky,[6] so far it is impossible to ascribe a Palaeolithic age to this site.

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[1] Uvarov, A. S., "The Archaeology of Russia," Moscow, 1881, Vol. 1, pp. 111.

Spitzin, "The Russian Palaeolithic Period," Zapiski of the Imperial Russian Archaeological Society, Slavic Division, Vol. XI, Petrograd, 1915, p. 140.

Vishnevsky, B. N., "Prehistoric Man in Russia," appendix to translation of Osborn's "Men of the Old Stone Age," Leningrad, 1924.

[2] Krishtaphovich, N. I., "New Traces of Prehistoric Man in Kiev," Appendix to the Izvestia of the Imperial Archaeological Committee, St. Petersburg, Vol. I, p. 40.

[3] Spitzin, A. A., "The Russian Palaeolithic Period," Zapiski of the Imperial Russian Archaeological Society, Slavic Division, Vol. XI, Petrograd, 1915.

[4] Kaminsky, F., "The Traces of the Most Ancient Period of the Stone Age Along the River Sula and its Tributaries," Trudi of III (Kiev) Archaeolog. Congress, Kiev, 1878, Vol. I, pp. 147–152.

[5] Spitzin, A. A. ("The Russian Palaeolithic Period," Zapiski of the Imperial Russian Archaeological Society, Slavic Division, Vol. XI, Petrograd, 1915), quotes from the article of Samokvasov in Anthropological Viestnik, Vol. III, pp. 3–38.

[6] Rudinsky, M., "The Finds in Shapovalovka," Die Quartarperiode, Vols. 1–2, No. 10, 1930, pp. 37–42.

52. Selis'che

Selis'che [1] is situated near the village of Selis'che, Kanev district, Kiev region. The only mention of it is in a short notice of Krishtaphovich,[2] who states that this station, as well as the Kiev site, is situated on the main bank of the Dnieper valley under the layer of loess-sand deposits above the moraine clay. Animal bones and flint tools were found there. This site was further investigated from a geological point of view by Krishtaphovich in 1904.

53. Schurii Rog

This site is situated in the village of Schurii Rog in the Izum district, Kharkov region. The discovery of mammoth bones and flint industry was made in 1920, and confirmed in 1923 by O. Pheodorovsky.

According to Rudinsky,[3] there is a small unpublished collection in the Kharkov Museum, consisting of implements made of rose-colored flint, among which are several burins of poor technique and without retouch, similar to those of Zhuravka.

54. Kolachkovichi

M. Rudinsky [4] states that in the village Kolachkovichi, of the Kamenetzk district, Podol region, he discovered a site with late Aurignacian industry. The material is to be published. [5]

55. Kosheleva

M. Rudinsky [6] states that in the village Kosheleva, of the Kamenetzk district, Podal region, he discovered a site with late Aurignacian industry. The material is to be published.[7]

56. Questionable Sites

M. Rudinsky [8] lists the following locations and suggests the possibility of discovering there, with further investigation, palaeolithic remains.

(*a*) *Skakalka*,[9] near the village of Gorodische, Kremenchug district, Poltava region, where in 1922 were found remains of mammoth bones and a wide flint blade, heavily patinated.

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[1] Spitzin, A. A., "The Russian Palaeolithic Period," Zapiski of the Imperial Russian Archaeological Society, Slavic Division, Vol. XI, Petrograd, 1915.

[2] Krishtaphovich, N. I., "Geological Investigation of the Palaeolithic Site during the Summer of 1904," Drevnosti, Trudi of Moscow Archaeological Society, Vol. XXI, part 2, p. 178.

[3] Rudinsky, M., "Scientific Work in Palaeolithic and Mesolithic Culture in Ukraine during the Revolution" (Annual Report of the Anthropological Laboratory of Th. Volkov for 1930, Vol. IV, Kiev, 1931, p. 148).

[4] Rudinsky, M., *op. cit.*, p. 149.

[5] Field, H., and Prostov, E., ("Recent Archaeological Investigations in the Soviet Union," A. A., Vol. 38, No. 2, 1936, pp. 275–276), list it as Kolach Kovtsy I–II. According to them both sites are Aurignacian "with implements and fragments of bones of small animals belonging to the final phase of the Quaternary period in eastern Europe." (E. G.)

[6] Rudinsky, M., *op. cit.*, p. 149.

[7] Field, H., and Prostov, E., *op. cit.*, spell it Kuzheleva. (E. G.)

[8] Rudinsky, M., "Scientific Work in Palaeolithic and Mesolithic Culture in Ukraine during the Revolution," Annual Report of the Anthropological Laboratory of Th. Volkov for 1930, Vol. IV, Kiev, 1931, p. 150.

[9] A notice in the Annual Report of the Anthropological Laboratory of Th. Volkov, Vol. I, Kiev, 1925, p. 27.

(*b*) *Babanka,*[1] Uman district, Kiev region, where ribs of large fossil animals were found in loess.

(*c*) *Gai,*[2] Romni district, Poltava region, where bones of *Rhinoceros tichorhinus* and rough flint flakes were found.

(*d*) *Gorbov and Yuhnovo,*[2] Novgorod-Sieversky district, Chernigov region, where mammoth bones and flint flakes were found.

Vishnevsky,[3] probably after Spitzin,[4] lists also:

(*e*) *Degtiarevo,* Chernigov region, where a pile of split mammoth bones were found at a depth of six feet.

(*f*) *Umrichino,* Kursk region, where mammoth bones were found in association with flint tools. Spitzin doubts the Palaeolithic age of the site.

57. Additional Sites

The following are additional sites discovered during the last few years according to the information compiled for H. Field and E. Prostov,[5] through the cooperation of the Director of the All-Ukrainian Academy of Sciences (VUAN), F. A. Kozubovsky:

Sokol, on the river Dnieper, Podol region.
Vrublintsy, on the river Dnieper, Podol region.
Kitaigorod I and II, on the river Ternava, Podol region.
Demshin, on the river Dniester, Podol region.
Bakota, on the river Dniester, Podol region.
Staraya Ushitza, on the river Ushitza, Podol region.
Kalus, on the river Dniester, Podol region.
Semenki, on the river Boog, Podol region.
Gorodok, on the river Goryn, Volyn region.
Korosten near Iskorost, on the river Uzh, Volyn region.
Pushkari, on the river Desna, Chernigov region.
Novgorod Sieversky, on the river Desna, Chernigov region.
Krivoi Rog, on the river Ingulets, Dniepropetrovsk region.
Kodak village (location not indicated), Dniepropetrovsk region.
Miorka (discovered in 1932), Dneproges region.
Yamburg (discovered in 1934), Dneproges region.

Unfortunately the above is all the information given by Field and Prostov, so that any idea of the dating and cultures must be deferred for the future.

According to Field and Prostov,[6] a series of new sites was discovered by the Abkhazian Expedition of the Institute of Anthropology and Ethnography of Leningrad under the leadership of S. N. Zamiatnin, who began the survey in 1934, in cooperation with a geological expedition of the Russian Academy of Sciences.

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[1] *Ibid.*, p. 22.

[2] Semenchik, M., "Some Prehistoric Finds in Romni District," Annaul Report of the Anthropological Laboratory of Th. Volkov, for 1929, Vol. III, Kiev, 1930, p. 209.

[3] Vishnevsky, B. N., "Prehistoric Man in Russia" Appendix to translation of Osborne's "Men of the Old Stone Age," Leningrad, 1924, pp. 441–508).

[4] Spitzin, A. A., "The Russian Palaeolithic Period," Zapiski of the Imperial Russian Archaeological Society, Slavic Division, Vol. XI, Petrograd, 1915, pp. 132–172.

[5] Field, H., and Prostov, E., "Recent Archeological Investigations in the Soviet Union," A. A., Vol. 38, No. 2, 1936, pp. 274–276.

[6] Field, H., and Prostov, E., "Archaeology in the Soviet Union," American Anthropologist, Vol. 39, No. 3, July–September, 1937, pp. 459–460.

The following list of sites is given, most of which are situated on the eastern shore of the Black Sea. (See map, Fig. 20.)

1. Byrts, southeast of Yashtukh Mountain. Acheulean.
2. Gvard, south of Byrts. Acheulean.
3. Apiancha Mountain, near Tsebelda, east of Sukhum. Acheulean.
4. Yagish Mountain, on the left bank of Madzharkl River. Acheulean.
5. Akhabiuk, near Mikhailovskoe, north of Sukhum. Mousterian.
6. Kelasuri, on Kelasuri River, five km. southeast of Sukhum. Mousterian.
7. Esheri, on the right bank of Gumista River, seven km. west of Sukhum. Mousterian.
8. Okum, near railroad, seven km. southeast of Ochemchiri. Mousterian.
9. Chuburiskhindzhi, twelve km. southeast of Gali, near Sanzhio Mountain. Mousterian.
10. Lichkop, two km., north of Sukhum. Mousterian and Upper Palaeolithic.
11. Gali, Asheulean, Mousterian, and Upper Palaeolithic.
12. Achikhvari, north of Ochemchiri.
13. Kolkhida, five km. southeast of Gagry.
14. Barmish, five km. east of Kolkhida.

It is indicated that during the summer's work some twenty Palaeolithic sites were discovered, though no further names of sites are given. We have no idea of their industry beyond the statement that these sites represent, "mainly Aheulian, Clactonian, Levalloisian and Mousterian types, while Upper Palaeolithic implements were also excavated." [1]

It is important to remember that, as a whole, the terms "Acheulean" and "Mousterian" are used by Russian Archaeologists in a temporal, rather then cultural sense, though Field and Prostov specifically mention that, "at several sites, for the first time in the U.S.S.R., Lower Palaeolithic *coups de poing* were found." The basis for the dating is not indicated beyond stating that, "in many cases it was possible to establish the connection between the Palaeolithic implements of various periods and the corresponding sea terraces."

Further details pertaining to faunal remains, types of industry, and conditions of deposition, are needed in order to form a clearer conception of these important discoveries.

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[1] *Ibid.*, p. 460.

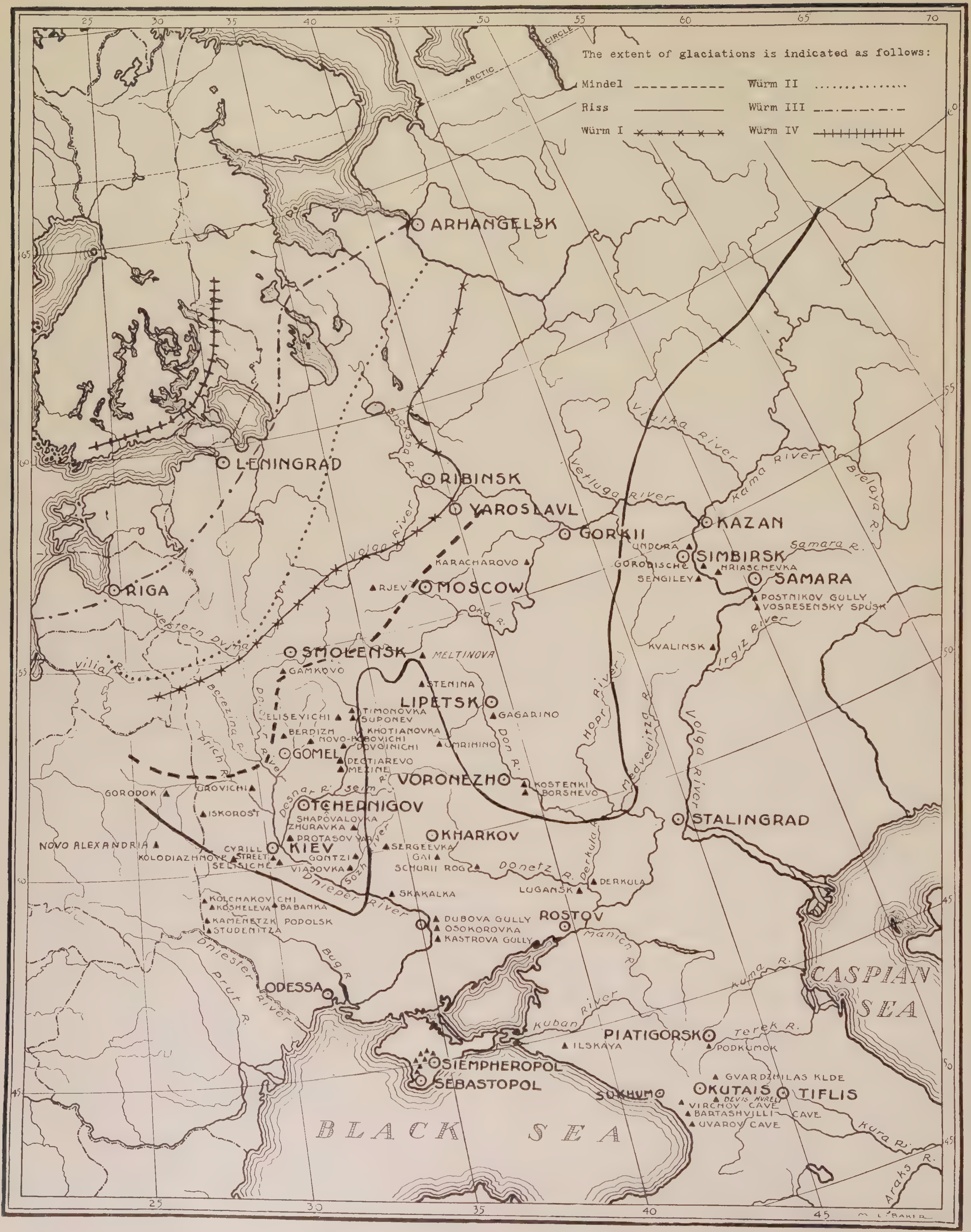
The extent of glaciations is indicated as follows:
Mindel
Riss
Würm I
Würm II
Würm III
Würm IV
ARCTIC CIRCLE
ARHANGELSK
LENINGRAD
RIBINSK
YAROSLAVL
GORKII
KAZAN
SIMBIRSK
SAMARA
RIGA
MOSCOW
SMOLENSK
LIPETSK
GOMEL
VORONEZH
TCHERNIGOV
KHARKOV
KIEV
STALINGRAD
ROSTOV
ODESSA
SIEMPHEROPOL
SEBASTOPOL
PIATIGORSK
SUKHUM
KUTAIS
TIFLIS
UNDORA
GORODISCHE
HRIASCHEVKA
SENGILEY
POSTNIKOV GULLY
VOSRESENSKY SPUSK
KVALINSK
KARACHAROVO
RJEV
MELTINOVA
GAMKOVO
STENINA
GAGARINO
ELISEVICHI
TIMONOVKA
SUPONEV
KHOTIANOVKA
BERDIZH
NOVO-BOBOVICHI
DOVGINICHI
UMRIHINO
DEGTIAREVO
MEZINE
KOSTENKI
BORSHEVO
GORODOK
UROVICHI
ISKOROST
SHAPOVALOVKA
ZHURAVKA
PROTASOV YAR
NOVO ALEXANDRIA
CYRILL STREET
KOLODIAZHNOYE
SELTSICHE
GONTZI
VIASOVKA
SERGEEVKA
GAI
SCHURII ROG
DERKULA
LUGANSK
SKAKALKA
KOLCHAKOVICHI
KOSHELEVA
BABANKA
KAMENETZK PODOLSK
STUDENITZA
DUBOVA GULLY
OSOKOROVKA
KASTROVA GULLY
ILSKAYA
PODKUMOK
GVARDZHILAS KLDE
DEVIS HVRELI
VIRCHOV CAVE
BARTASHVILLI CAVE
UVAROV CAVE
Sheksna R.
Volga River
Vyatka River
Vetluga River
Kama River
Bielaya R.
Samara R.
Oka R.
Irgiz River
Western Dvina
Vilia R.
Berezina R.
Dnieper River
Pripet R.
Desna R.
Seim R.
Sozh River
Don R.
Hopr River
Medveditza R.
Volga River
Donetz R.
Derkula R.
Dniester River
Prut R.
Bug R.
Manich R.
Kuma R.
Kuban River
Terek R.
Kura R.
Araks R.
BLACK SEA
CASPIAN SEA
25
30
35
40
45
50
55
60
65
70
M. L. BAKER

Fig. 100. Map of Palaeolithic Sites of European Russia.

CONCLUSIONS

The question of the evaluation and dating of Palaeolithic cultures of European Russia presents considerable difficulties.

The size of the territory involved, the divers geological and topographical features, and the inadequacy of information about various determining factors, make the application of criteria, evolved, tested, and valid for Western Europe, at least a dangerous procedure here.

Another difficulty is met, it must be reluctantly admitted, in the fact that Russian archeologists have not as yet established any definite conception of the historical processes involved, even among themselves.[1]

In a preface to Dr. D. A. Garrod's work on the Upper Palaeolithic Age in Britain, M. L'Abbe Breuil, in speaking about English pre-historians, says: "Leur vocabulaire pour designer les formes industrielles est trop personnel, et leur connaissance de ces dernieres et de leur signification bien souvent tout a fait rudimentaire." [2]

This severe, but just, accusation may be applied to a great many authors of works on the Palaeolithic in other regions, not excluding Russia. Not only is "individualism," in purely technical terminology, very abundant (see Gorodzov's one hundred and seven types of burins) but even the general understanding of such terms as "Aurignacian," "Solutrean," and "Magdalenian," vary more than should be permissible, even for such a relatively young science as Prehistory.

This last situation is augmented by the fact that most Western European specialists employ the subdivisions of Mortillet, not only with temporal significance, but also in a cultural sense, associating them with specific ethnic groups. Thus, we may find the same author speaking of Aurignacian or Solutrean "race"; as well as Aurignacian, Solutrean, or Magdalenian "times."

While one is somewhat justified in using these terms in both senses in application to Western Europe, or more specifically to France, difficulties arise the moment one leaves the territory of the type sites. Well realizing that not all peoples of the world had precisely the same culture at a given period, European students stress the ethnical meaning of these terms and are busy tracing the influences and explaining the differences between the "mother" cultures and their derivatives. And yet, in many cases, they take as a basis for comparison the "classical" culture, which often is not the original "mother" complex underlying the subsequently developed local variations, but the specific manifestation, locally developed, sometimes tinted by other influences, and often of a very short duration.

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[1] Attempts to apply the Marxian historical method to the reconstruction of the history of early man, occupy a place of prime importance with Soviet Prehistorians. The following are some examples of the articles devoted to discussions on these problems.

Zhakov, M. P., "The Problem of the Genesis of Human Society." Problems of the History of Pre-Capitalistic Societies. Leningrad, May, 1934, No. 5, pp. 29–46.

"Labor, Technique, and Industrial Relation in Early Society," *Ibid.*, June, 1934, No. 6, pp. 9–45.

Ravdonikas, V. I., "The Periodisation in the History of Pre-Clan Society," *Ibid.*, July–August, 1934, No.7–8, pp. 72–87.

"To the Question of Dialectics of the Development of Pre-Clan Society," *Ibid.*, February, 1934, No. 2, pp. 25–48.

"The Marxian History of Material Culture," Izvestia of the State Academy for the History of Material Culture, Vol. VII, Part 3–4, Leningrad, 1930, pp. 1–94.

Meschaninov, I. I., "Paleonthology and Homo Sapiens," *Ibid.*, Vol. VI, Part 7, pp. 1–36.

Boriskovsky, P. I., "The Historical Premises of the Origin of the So-Called 'Homo Sapiens,'" Problems of the History of Pre-Clan Societies, 1935, No. 1–2, pp. 5–46.

Sagatsky, A. P., "Labor and the Origin of Society," *Ibid.*, 1935, No. 1–2, pp. 177–192.

[2] Garrod, D. A., "The Upper Palaeolithic Age in Britain," Oxford, 1926, p. 5.

The "classical" Solutrean, which in its pure form has such limited distribution both in space and time, may serve as an example. Outside of the very restricted area of central France, Cantabria, and Catalonia, the investigator, in describing the culture studied, has to point out either the absence of the basic elements, or the presence of new ones. Consequently, in the majority of cases, so little is left from the contents of the "basic" culture, that the exceptions constitute the bulk of the traits. The net result is often so complicated that new terms, such as Proto-Solutrean, Pseudo-Solutrean, Upper and Lower Solutrean, are invented, only to make matters further involved.

Perhaps sensing this difficulty, the Russian archaeologists tried to avoid it by assigning only temporal significance to the above terms. Their effort to tie up the archaeological divisions with specific types of social structure and all its resulting complexes, led them, however, into another set of complications.

Before discussing the Palaeolithic industries of European Russia, it is thought advisable to outline briefly some of the basic assertions of Soviet Prehistorians, which often serve as the foundation for their dating and interpretation of cultural finds.

One of the most important points of divergence is the acceptance of the universal evolutionary scheme of cultural development with the material basis as the main determining factor. This results in a fairly well outlined succession of the phases of social structure, corresponding to the different stages of industrial development. It may be illustrated, though perhaps subject to modifications and some corrections, with the scheme given by V. I. Ravdonikas,[1] to which the present author adds the concepts of N. Y. Marr, on the evolution of modes of thinking, writing, and language.

The Development of Society

As is seen from the chart (page 445) the center of gravity lies in the method of production, (the basis of industry) determining the appearance of "additional values" which, in turn, determine the type of social structure and all its super-structures (religion, art, language, etc.).

The Soviet archaeologists postulate this universal scheme of development as an inevitable course of evolution, recognizing, however, that "the stages long passed by a given historical society, which is today on a higher plane of development, may still be experienced by other societies in different geographical regions."[2] Likewise, they recognize the possibility and occurrence of "survivals" of archaic forms in later periods.

At the same time, they very strenuously object to other methods of explanation of similarities or differences in cultural phenomena, such as "migrations," "borrowing," and

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[1] "The Question of the Sociological Periodisation of the Palaeolithic Period in Connection with the Opinion of Marx and Engels on Primitive Society." Izvestia of the State Academy for the History of Material Culture, Leningrad, 1931, Vol. IX, p. 2.

[2] Ravdonikas, V. I., *op. cit.*, p. 3.

THE DEVELOPMENT OF SOCIETY.

Geological epoch.	Archaeological period.	Physical type.	Technique of tool making.	Tools—indicators of production.	Main productions	Gain	Production relationship.	Form of society.	Ideology.	Modes of communication.	Modes of thinking.	Marriage.	Writing.	Type of speech.
RECENT	IRON	Modern Man.	Casting, welding, soldering, etc.		Complex agriculture and industry.	Basis of society.	Kings. Chiefs. Organized trade.	Capitalism.	Organized religion.	Sound language.	Modern. Realistic. Micro-cosmic.	Patriarchal family.	Alphabet.	Flective.
	BRONZE		Welding. Casting.	Weapons. Armor, etc.				Feudalism.						
	COPPER		Cold and hot method.	Weapons. Sickles.	Agriculture. Herding.			Father's clan.				Father-right ↕ Classical mother-right.	Ideogram and syllabical sign.	Agglutinative.
	NEOLITHIC		Drilling and polishing of stone. Pottery.	Axe. Hoe. Bow and arrow.	Hoe-culture. Beginning of domestication of animals.		Separation of organizers. Social labor divisions. First barter.	Mother's clan.	Animism and cult of ancestors.	Kinetic language.	Ethnographical totemism. Mythological.		Pictogram. ↕ Ideogram.	Amorphic-synthetic.
WÜRM	PROTO-NEOLITHIC	Cro-Magnon Man Grimaldi Man	Work on Bone. Pressure-flaking. Blade detaching. Engraving.	Dart and harpoon points. Needles. Knives. Engraving tools.	Organized hunting and fishing.	Permanent supplies.	Sex division of labor. Appearance of leaders in process of collective hunting.	Proto-clan society. Age-sex groupings.	Production magic.			Pair family.		
	MAGDALENIAN											Origin of clan. Early exogamy. Two class system. Matrilocality. Matrilineal descent. Group marriage. Pair family.	Picture-idea. Pictographs.	Transition to Amorphic-synthetic.
	SOLUTREAN													
	AURIGNACIAN													
RISS-WÜRM	MOUSTERIAN	Homo-Neanderthalensis	Flakes detached. One side retouched.	Point. Scraper.	Hunting.	Beginning of permanent supplies.	Primitive division of labor according to sex and age.	Stable group of hunters with permanent center.			Ethnological totem.	Beginning of consanguin family.	Diffused sign.	↑
RISS	ACHEULEAN	Homo-Heidelbergensis	Byfacial chipping.	Hand axe as universal tool.	Gathering and small game hunting.	Absence of permanent supplies.	Simple coöperation.	Primitive communism. Collective with artificial tools.			Cosmic thinking.			
MINDEL-RISS	CHELLEAN											Sexual promiscuity.		
	PRE-CHELLEAN										Horde consciousness.			
MINDEL	EOLITHIC	Pekin-Man. Java-Man.	Natural tools.	Eoliths.	Gathering.			Collective of gatherers with natural tools. Horde						Amorphic

"superior races," very much used, and, one should confess, often misused, by the Euro-American scientists.

The biological development of man is also pictured as one uninterrupted chain of evolution. Meschaninov, one of the ablest followers of N. Y. Marr, father of the science of Japhetology, expresses this point of view in his work "Palaeontology and Homo Sapiens" (*op. cit.*). He considers Cro-Magnon man not a different race from Neanderthal, but a direct descendant of the latter. He even adds that, "we have no facts for the assertion that this transformation did not take place in Europe." [1] The usual conception that the new race came and displaced the old one is vigorously denied as one contradicting the "unity of the process of development." [2]

The fact that we are dealing not only with two cultural divisions (Mousterian and Upper Palaeolithic) but also with two different physical types, is very ingeniously dealt with by P. P. Ephimenko. He refutes the hypothesis of the wholesale destruction of Neanderthal Man, with Mousterian culture, by the new "superior race" of Cro-Magnon, with Aurignacian culture, and considers this explanation comparable to the idea of "cataclysms," abandoned by science over a hundred years ago.[3]

Following the accepted Soviet conception of the unilineal development of culture and their anti-migration tendency, he considers that such sites as Abri-Audi and Shaitan-Koba in Crimea, conclusively prove the uninterrupted chain of development from Mousterian to the Upper Palaeolithic. Thus he derives the Châtelperron point made on a blade, from the Mousterian point made on a flake.

Likewise, the appearance of bone industry which takes place, in its embryo form, in Mousterian culture (La Quina, Kiik-Koba, Chokurcha, etc.), and especially the new method of detaching of blades from the prismatic nucleus, instead of triangular flakes from the discoidal one, are, in his opinion, the most important technical inventions during Upper Palaeolithic times. Again, faithful to the Marxian interpretation of history, he attributes these changes to a material basis. Such factors as the change of climate, followed by the change of fauna, necessitated a transition from the primitive horde, consisting of small groups of game hunters very much scattered over an enormous territory with very little intercommunication, to the stable, larger, and more or less permanent hunting society.

The small size of the Mousterian groups led, in the opinion of Ephimenko, to incestuous mating and the degeneration, which manifested itself in such physical characteristics as low forehead, very much developed supraorbital ridges, etc. This retarded the growth of population and, in general, had an unfavorable influence on the physical development of Neanderthal Man.[4]

At this point Ephimenko finds himself in a dilemma. On one hand he tries to refute the usual conception of Neanderthal Man as a physically less endowed individual than his successor. In fact, he sees in the comparatively poor inventory of Mousterian industry, a proof of the tenacity and ingenuity of Neanderthal Man, who with such simple tools was able to maintain an existance. To make this more convincing, he even attempts to reconstruct the conditions of the Glacial epoch as being far less severe than it is usually depicted. Al this is done with one idea in mind: to refute the assertion that Neanderthal Man is of a different, inferior race, non-ancestoral to modern man. However, the facts show that the skeletal remains of Mousterian Man have very primitive characteristics; hence, the "degeneration," based on close intermating, is brought up to explain away this glaring inconsistency.

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[1] Meschaninov, I. I., "Palaeontology and Homo Sapiens," *op. cit.*, p. 11.

[2] *Op. cit.*, p. 12.

[3] Ephimenko, P. P., "Pre-Clan Society," Leningrad, 1936, p. 261.

[4] *Ibid.*, p. 213.

What remains, then, is still another set of facts: the superior physical characteristics of Cro-Magnon Man, and his superior industry. "Only during the next stage of the development of primitive industry," he writes,[1] "did the new conditions of existence change the character of the social structure, creating, instead of closed primitive groups, more complex combinations of intercommunicating hordes, connected with each other. Only in these conditions could have taken place the rapid cultural growth and formation of the new human type, which entered the history of Europe, during the Upper Palaeolithic epoch, as the Cro-Magnon race."

This eugenic explanation of the physical characteristics of Cro-Magnon and Neanderthal Man is not accepted by all Soviet archaeologists. Thus, Bonch-Osmolovsky writes: "Neanderthal Man, in the light of present-day knowledge differed physically from modern man, and, in comparison with the latter, was very much limited in his functional possibilities." [2] On the basis of the study of arm bones from Kiik-Koba, he asserts that the structure of the hand prevented Neanderthal Man from making long knife-like blades, the detaching of which required a very accurate blow. For the same reason, he could not have used the spear for throwing, and hence knew only its piercing use. He sees in Neanderthal Man a certain stage of "perfection process" of a humanized animal, and not a degenerate group resulting from close intermarriage. Bonch-Osmolovsky warns some of his colleagues about underestimating the importance of physical limitations in the development of culture. "We have every reason to assert that whole series of the working processes were unattainable to Neanderthal Man due to his anatomical imperfection," he writes, explaining the appearance of Cro-Magnon Man as the continuation of the process of perfection on the basis of his social development. "It is necessary to say that there could be no purely biological evolution of man, as all his physical changes were dictated by the gradual development of social life, and that the present physical conditions and physiological processes are the result of social influences on the organisms of his animal ancestor." [3]

The often invoked "migrations" and vainly sought and much fought for "centers of origins of cultures," form another target of attack for Soviet archaeologists as the unnecessary evasions of much simpler and more certain explanations. To quote Ravdonikas again, the Kultur-Krise group "presupposes the basis distinction of the cultural ability of people, the division into the chosen, or leading groups and the delinquent ones, which are predestined to be the 'manure of history,' the idea on which the whole colonial policy of the imperialistic bourgeoisie is based." [4]

"The tracing of migrations," writes Meschaninov,[5] "inevitably leads to the so-called 'cultural centers,' which are often established by the deliberate desire of the investigator. . . . Besides, these migrations are found to be especially active in the prehistoric times

[1] *Ibid.*, p. 214.

[2] "The Problems of the Complex Study of the Quaternary Period," Soobschenia of GAIMK, No. 3–4, Leningrad, 1932, p. 47.

[3] *Ibid.*, p. 48.

[4] "The Question of the Sociological Periodisation . . .," p. 4.

[5] "Palaeontology and Homo Sapiens," p. 7.

which are not documented by written sources. This makes us see the 'activity' not on the part of the tribes, but in the minds of investigators themselves, who cannot comprehend the complex forms of the studied objects, and, therefore, resort to much simpler explanations, by tabulating on a map the supposed routes of movements from the original cradle places, designated as cultural centers."

While not all of the present Soviet archaeologists subscribe *in toto* to these views, and many of them are constantly being criticised and corrected for deviations, or indulgence in the erroneous bourgeois theories, the above opinion could be taken as a sufficiently accurate presentation of the accepted ideas on the subject and may serve to explain the differences in dating and interpretations of the Palaeolithic sites.

The present writer, being a product of the American School of Anthropology, does not believe that the uninterrupted scheme of cultural evolution has been proven beyond a doubt. He also makes use of the arrivals of new races, migrations, and "cultural centers," as explanations when warranted by the material at hand. Yet, there is a great deal of truth in this perhaps too vigorous criticism of our methods. Too often some studied group, dear to the heart of the investigator, is elevated to the position of a "superior race" or conclusions are allowed to rest upon arbitrarily invoked migrations which, unwarranted by either fact or logic, serve only to cover up the ignorance of the investigator, much as the proverbial term, "ceremonial," is used to explain the use of some puzzling object.

There are some hundred and thirteen localities listed in the present survey. (See map, Fig. 100.) From ten sites which produced skeletal material, only in two (Kiik-Koba and Devis-Hvreli) do we have an accompaning stone industry. Thirty-eight sites are so insufficiently described as to preclude any possibility of forming an idea of their age. The remainder are more or less adequately documented and permit certain generalizations.

Lower Palaeolithic Industries

European Russia seems to be very poor in remains of Lower Palaeolithic cultures. No true Chellean and Acheulean sites are found. Two accidental finds of *coup de poing* type of implement are questionable. The Rzhev specimen is very reminiscent of Neolithic tools, and the Volga find, while "classical" Acheulean in appearance and technique, is too much like a real French implement both in form and patination. One wonders if it was not "imported" by some amateur archaeologist from France and subsequently lost. At any rate, it would be very rash to assert the existence of a culture on the basis of two isolated finds, both very imperfectly documented.

The reported finds of a series of Acheulean sites in the Caucasus by Zamiatnin in 1934, may change the above conclusions. It is stated that Lower Palaeolithic hand-axes were found in several sites, some of which, apparently, could be geologically dated by correlation with sea terraces. Pending further information as to the industrial types and fauna, evaluation at present is impossible.

Middle Paleolithic Industries

The so-called "pre-Mousterian" cultures, the "atypical" of Bonch-Osmolovsky and the "Tyasian" of M. Breuil, such as are found in the lower layer of La Micoque and La Ferrassie, are represented in European Russia by the lower layer of Kiik-Koba. There were tendencies, on the part of some Russian investigators (Gorodzov and others), to doubt the existence here of two separate cultural layers. The examination of the collections and reproductions of M. Bonch-Osmolovsky and especially the drawings made by M. Breuil seem to substantiate the excavator's assertion.

The dating of Kiik-Koba, however, seems to be far from settled. Besides the known controversy which exists among European scholars as to the exact placing of La Micoque, the situation becomes still more complicated due to Bonch-Osmolovsky's assertion that his atypical industry is co-existent with the Chellean;[1] and that his second horizon corresponds to La Micoque, which he considers synchronal with Acheulean (Acheulean V–VI?).

An examination of the flora and fauna of Kiik-Koba layers points to the increasing cold during the second period of occupation of the cave. Thus, such animals as *Elephas primigenius*, *Rhinoceros tichorhinus*, *Ursus spelaeus* and *Hyena spelaea*, do not figure in the lower layer and appear in the upper. The quantitative analysis of the flora also shows four times more remains of *Juniper* sp. in the upper layer. In the same time there is nothing to indicate the possibility of an interglacial period for the lower layer, as Bonch-Osmolovsky supposes,[2] in spite of the fact that this would correspond to the opinion of M. Breuil, who places La Micoque with the warm fauna of Riss-Würm.

It would indeed be stretching the point, to consider the fauna of the lower layer of Kiik-Koba as that of a warm climate. Not only is the warm fauna of the Riss-Würm in Western Europe, such as *Elephas antiquus*, *Rhinoceros merkii*, *Hippopotamus*, etc., absent, which could be accounted for by local conditions, but out of eleven species listed for the lower layer of Kiik-Koba, only one, *Equus hemionus*, is not found among the animals of Suren I, which is also in the Crimea, and which, according to Bonch-Osmolovsky, belongs to Aurignacian times, or the Würm glaciation.

The only remaining explanation is that the first settlement of Kiik-Koba took place during the beginning of the Würm, and the second layer somewhat later, when the developed Würnian glaciers drew nearer and further lowered the temperature.

It seems to be also significant that in Kiik-Koba, (horizon not indicated) in Chokurcha, (Mousterian) and in Shaitan Koba, (Late Mousterian), Bonch-Osmolovsky found traces of the use of bone, similar to those described by H. Martin for the Late Mousterian site of La Quina.

In view of the above, and considering the fact that the fauna of Chokurcha differs from that of Kiik-Koba only in the absence of *Rhinoceros tichorhinus*, the dating of Kiik-Koba's upper layer as synchronous with the Acheulean in the old sense[3] cannot be accepted. Ephimenko[4] calls it Pre-Mousterian, or Archaic Mousterian, and Gromov,[5] Mousterian with Acheulian tradition.

The Micoquian type of industry, where small bi-facial tools are found in association with fine points and scrapers made on flakes, is also represented by Chokurcha and Wolf

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[1] Bonch-Osmolovsky, G. A., "The Evolution of the Old Paleolithic Industries," "Chelovek," No. 2–4, Leningrad, 1928, p. 184.

[2] Bonch-Osmolovsky, G. A., "The Evolution of the Lower Paleolithic Industries," Chelovek, No. 2–4, Leningrad, 1928, footnote to page 178.

[3] Bonch-Osmolovsky, G. A., "The Cuts and Notches on the Animal Bones of Palaeolithic Period," Soobschenia of the State Academy for the History of Material Culture, No. 8, August, 1931, pp. 25–27.

[4] Ephimenko, P. P., "Pre-Clan Society," Leningrad, 1936, pp. 157–159, 169.

[5] Gromov, V. I., "Geology and Fauna of the Palaeolithic Period in U.S.S.R.," Problems of the History of Material Culture, No. 1–2, Leningrad, 1933, p. 29.

Grotto in Crimea, and Ilskaya in the Caucasus. While in the case of the upper layer of Kiik-Koba and the lower layer of Chokurcha the similarity to La Micoque is pronounced, this tendency decreases in Wolf Grotto and appears still less in Ilskaya. The latter site seems to be a hybrid of "classical" Mousterian of Derkula type with the Mousterian of Acheulean tradition, as represented by the above-mentioned caves of Crimea.

A transitional position between the Middle Palaeolithic and the Upper Palaeolithic corresponding to that of Abri Audi in Western Europe, is occupied by the site of Shaitan-Koba, with its large *bifaces* and the appearance of a true blade industry.

In general, the lower and middle Paleolithic sites are not numerous in European Russia. The total, even counting Podkumok,[1] is less then twelve.

Gromov [2] dates these sites geologically as corresponding to the end of the formation of the ancient alluvials of the second terrace; that is to say, from the second half of Riss-Würm and the first part of Würm, to the time of the maximum development of this glaciation. In the open sites they are characterized by the steppe fauna, *Bovidae*, and mammoth; in the caves of the Crimea by the large quantity of *Megaceros*.

Upper Palaeolithic Industries

According to Gromov,[3] the Upper Palaeolithic sites of European Russia correspond in time to the formation of the second terrace (counting as the first the present flood-plain terrace in the valleys of the Dniester and Don), which took place in Würmian times in the dating of Mirchink.

Gromov states further, that early Aurignacian sites belong to the time of the early stages of the formation of this terrace; Middle and Late Aurignacian, Solutrean and Magdalenian to the middle stages of this formation; and Late Magdalenian to the last phases of it. Geologically, it would correspond to the period after the maximum development of Würm and the beginning of its retreat. As a rule, cultural remains are found in the middle horizons of the old alluvial deposits of these terraces, or in contemporaneous formations, which fill the gullies cutting the earlier terraces.

Zamiatnin, on the basis of comparative study, asserts that the older sites are usually situated at the mouths of the gullies, as in the case of Kostenki I, Gargarino, and Borshevo I; while the younger sites, such as Kostenki II, III, Borshevo II, Gontzi, etc. are in the actual valley of the river. Thus, according to him, the mere location of the site sometimes gives a clue for the determination of its date.

Much additional help is derived from the faunal complexes, which, according to Gromov, seem to have such definite character that, as in the case of Gagarino, the cultural stage can be determined by an analysis of the fauna. It is especially helpful for the cave sites of the Caucasus and Crimea, where the usual geological evidences are lacking.

Unfortunately, in European Russia there is practically a total absence of properly documented stratigraphy of distinctly different cultural layers. The case of Suren I, where Bonch-Osmolovsky distinguishes three horizons, does not warrant major cultural subdivisions, beyond the phases of the Aurignacian. The two horizons of Cyrill Street, are very poorly documented; the three layers of Borshevo II present a practically uniform cultural horizon. This scarcity of superimposed cultural layers, so valuable for comparative dating, may be due to the fact that in European Russia cave sites with Upper Paleolithic industries are very rare; the bulk of the finds are made in open sites.

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[1] The newly discovered sites in the Caucasus (pp. 440–441) are not being considered here, due to inadequacy of available information. If confirmed, they would increase the above figure by some twenty additional sites of Acheulean and Mousterian type of culture. (E. G.)

[2] Gromov, V. I., "The Geology and Fauna of the Paleolithic Period in U.S.S.R.," Problems of the History of Material Culture, No. 1–2, Leningrad, 1933, p. 29.

[3] Gromov, V. I., "Geology and Fauna of the Palaeolithic Period in U.S.S.R.," Problems of the History of Material Culture, No. 1–2, Leningrad, 1933.

Consequently, in the majority of cases, we are dealing with the open camp sites of hunting peoples, where two different cultural complexes can be distinguished. First, there are the large accumulations of animal bones, definitely segregated, often referred to as "hearths," and very much like the well-known bone piles from Predmost, Moravia. These accumulations of bones are variously explained as representing kitchen refuse, supplies for bone work, or fuel. As a rule, very few stone implements are found among these piles. Typical Russian examples of these bone accumulations are found in Borshevo I, Berdizh, Kostenki I, Gagarino, Timonovka, Gontzi and others.

The second complex, according to most Russian investigators, represents the place of a more or less permanent habitation of these hunting groups. It is characterized by the red pigmentation of the ground, due to the presence of the ochre; the remains of open fires, filled with ashes and charred bones; and, usually, by a large quantity of stone and bone tools.

In several cases (Kostenki I, Timonovka, Gagarino) definite traces of semi-permanent dwellings were found, sometimes with stone slab foundations (Gagarino), well-preserved fire-places and specially made hearths with "shoulders" (Kostenki I), and various types of entrances, post holes, chimneys, etc. (Timonovka).

Inside the dwellings, investigators often found copings, niches, in which objects were kept, and caches of flint and bone tools. Near-by were found storage pits and primitive "ovens," in the shape of coneformed pits.

Timonovka, judging by the enormous quantity of flints in every degree of completion, from the rough chunks of stone to the thousands of finished implements, evidently represents a large work shop.

The flint industry of the Upper Paleolithic of European Russia presents almost every variety of form known in Western Europe, except the very specialized types of "classical" Solutrean.

The "leading" bone forms, such as the Aurignacian cleft base point and harpoons, or any examples of cave art, which form the foundation of industrial dating for Western Europe, are totally absent in European Russia. Consequently, this necessitates an entirely new set of criteria for comparative dating, applicable, perhaps, only to this region.

The usual terms for the subdivision of Upper Palaeolithic industries are employed by Russian scientists, but, due to the general idea of the unilineal development of culture, with somewhat different implications.

Accepting, perhaps, too literally the Western European scheme of the succession of industries as a definitely evolutionary series, they use the terms Aurignacian, Proto-Solutrean, Solutrean, and Magdalenian, in the temporal sense, to designate certain stages of the development of culture, rather then the specific cultures.

The usual criteria of Western Europe being absent, they attach the utmost importance to anything suggesting bifacial flaking (even if it is only a reduction of the bulb) and consider the presence of *point à cran*, even in its most atypical form, as indicating Solutrean temporal affinities.

Establishing this as a middle point for the dating, they class the industries where these characteristics are less prominent, as older, or Aurignacian; other industries which show the general decadence of technique or, for any other reason, are thought to be younger, as Magdalenian.

It may be significant that Ephimenko finds the true Aurignacian represented in Russia only by one site: Suren I in Crimea.[1] The rest of the Upper Palaeolithic sites, excluding the transitional group with microlithic industries, he divides into two groups: Aurignacian-Solutrean and Solutrean-Magdalenian, stating that there are no true Solutrean sites known in European Russia.

Ephimenko, Zamiatnin, and others, more or less agree to consider as Proto-Solutrean (Aurignacian-Solutrean or Russian Solutrean) the type of culture encountered in the loess in sites such as Predmost, Willendorf, Kostenki I and others, where we have more or less permanent camps of mammoth hunters characterized by large accumulations of mammoth bones, the presence of ochre pigmentation, and by the stone industry of the developed Aurignacian type coupled with the *point à cran* and some Solutrean-like bifacial retouch. Here, contrary to the usual assertions, art is fairly prominent; numerous carved stone and bone objects appear, and female statuettes are frequently found. Traces of semi-subterranean huts, in the shape of pits, sometimes reinforced with stone slabs, complete the list.

This scarcity of Aurignacian sites is due to the fact, as it was pointed out above, that every time *point à cran*, even in its atypical form, makes its appearence in a given industry, the site is dated as Aurignacian-Solutrean by Russian scientists.

The term Solutrean-Magdalenian is applied to all those sites which, either geologically or by some characteristic of the industry, appear to be younger than the first group. As "classical" Madgalenian, with its cave art, various harpoons, etc., is not found in European Russia, it is extremely difficult to distinguish between the developed Aurignacian and Magdalenian deposits. Since the usual criteria for dating are lacking, Russian archeologists have resorted to such general characterizations as microlithic tendency, atypical character, variety of form, decadence, and negligence of technique.

Thus, Ephimenko dates Kostenki II and III as Magdalenian on the basis of "general archaic or decadent character of the industry," while Menghin describes them as representing the "degeneration of Aurignacian technique." If we accept the absence of the Solutrean as established, then there is, in fact, no more contradiction between Ephimenko and Menghin, than in the case of Karacharovo, which Zamiatnin dates "later than final Aurignacian" and Ephimenko, as "early Magdalenian."

Basically, we seem to have in European Russia, the Early, Middle, and Late Upper Palaeolithic industries, all characterized by the blade technique, which starts very much like the Aurignacian in Western Europe, develops, aquires some peculiar traits suggesting Solutrean influence, and then slowly degenerates, finally reaching the stage of a microlithic industry.

The origin of this Aurignacian culture still remains unsettled. Burkitt's theory of a southern source may find added confirmation in the fact that in its purest form it is found only in the south of Russia—Crimea.

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[1] It should be borne in mind, that in his most recent work (Pre-Clan Society) Ehimenko analyzes only about one fourth of the total number of sites, discussing, naturally, only the richest and the best known. (E. G.)

The Solutrean influences, as seen in some bifacial chipping and *point à cran*, seem to have their origin in Hungary. There was, perhaps, sufficient connection between the Aurignacian cultures of Central Europe and the Solutrean in Hungary, to facilitate the spread and interchange of cultural traits. Much in the same way as the peripheral site of Yankovichi [1] receives the cultural elements of the Aurignacian in the form of the typical cleft-base bone point, in contrast with the boneless Solutrean cultures of other sites in Hungary, the series of North German, Moravian, Polish, and Russian sites may have received some of the Solutrean influences from Hungary.

The gap between Hungary and central Russia is particularly well filled by the Polish sites. Thus, in the cave of Nietoperzowa, near Ojcow [2] (excavated by Krukovsky and further analysed by Sawicki) we seem to deal with two horizons. The lower horizon has crude laurel leaf points, with partial lower face retouch, as well as some typical Aurignacian forms employing fine Aurignacian retouch. In the upper layer the "Solutrean" influences increase, resulting in a series of regular laurel leaves with a fine flat retouch, usually covering the upper face completely, and the lower face only partially.

Further west, in European Russia, in such sites as Kostenki I, Borshevo I, Berdizh, etc., this distant echo of the Hungarian Solutrean is found only in the appearance of the retouch on the lower face, and then only partially, and in *point à cran* of a very atypical form. If the supposition of the Hungarian origin of these influences is accepted, the "cultural lag" will necessitate dating these Russian sites as younger than corresponding cultures of Poland and Moravia.

It is hard to say whether this more widely spread culture, which often is referred to as Proto-Solutrean, is the basic stratum and the Hungarian and French Solutrean only its local specializations, or whether, as was indicated above, the Moravian, Polish, and Russian sites represent the peripheral regions, which have received only a partial impetus from the original Hungarian source and have never developed further.

The presence of art works and bone industry, so alien to "classical" Solutrean sites, seems to indicate the plausability of the latter theory of the basic Aurignacian stratum, which received cultural influences of various strength, diminishing with the increase of the distance from the center.

Following the example of Polikarpovich, the present writer feels that in the absence of other terminology, one may be justified in speaking of Early, Middle, and Late Upper Palaeolithic in European Russia, supplementing the industrial characteristics with the geological data, as the only true criterion for dating.

The Russian material seems further to strengthen the necessity of using such terms as Solutrean and Magdalenian, not as temporal subdivisions, but more in the ethno-cultural sense; thus, the Solutrean must be considered as a specific cultural episode of comparatively short duration, and the "classical" Magdalenian only a local ethnic variation of that basic Upper Paleolithic facia of human development which is much more universal, and which we usually call Aurignacian.

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[1] Breuil, H., "Notes de Voyage Paléolitique en Europe Central," L'Anthropologie, t. XXXIII, 1923, p. 338.

[2] Sawicki, I., "La Grotto Nietoperzowa à Jerzmanowice près Ojców, district Olkusz," Revue Archologique Polonaise, Poznan, 1926, Vol. III, Pt. 1, pp. 1–8.

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